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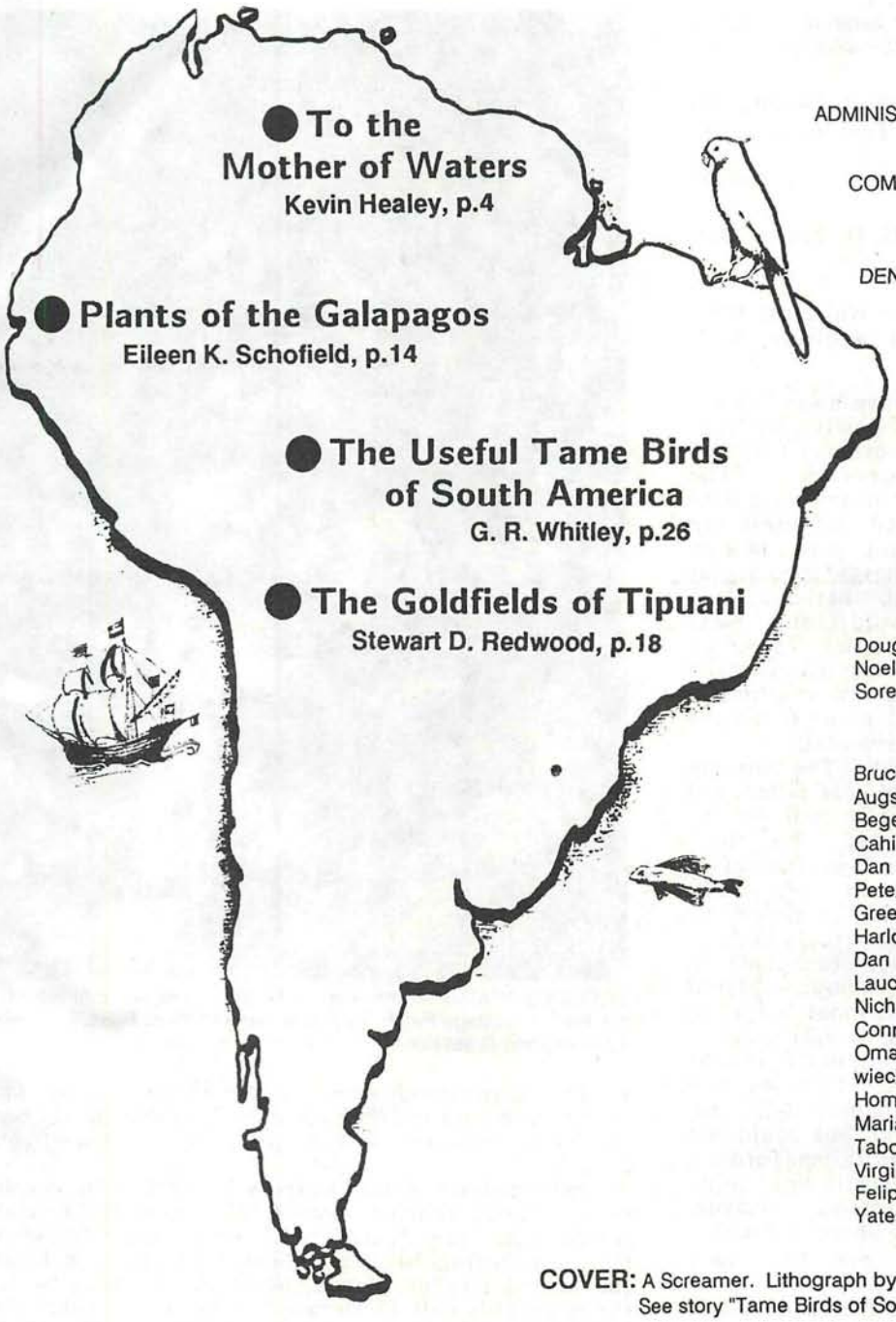

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To the Mother of Waters

By Kevin Healey

I admit your plateau, because I have seen it. But I have not yet satisfied myself that it contains any form of life whatever.

-- Professor Summerless
in *The Lost World*, 1912

[On the summit] one feels oppressed, dwarfed, almost as if one were a trespasser.

-- G. H. Tate, 1930

Aye, it's not a bad wee mountain.

-- Don Whillans, BBC
Roraima Expedition, 1973

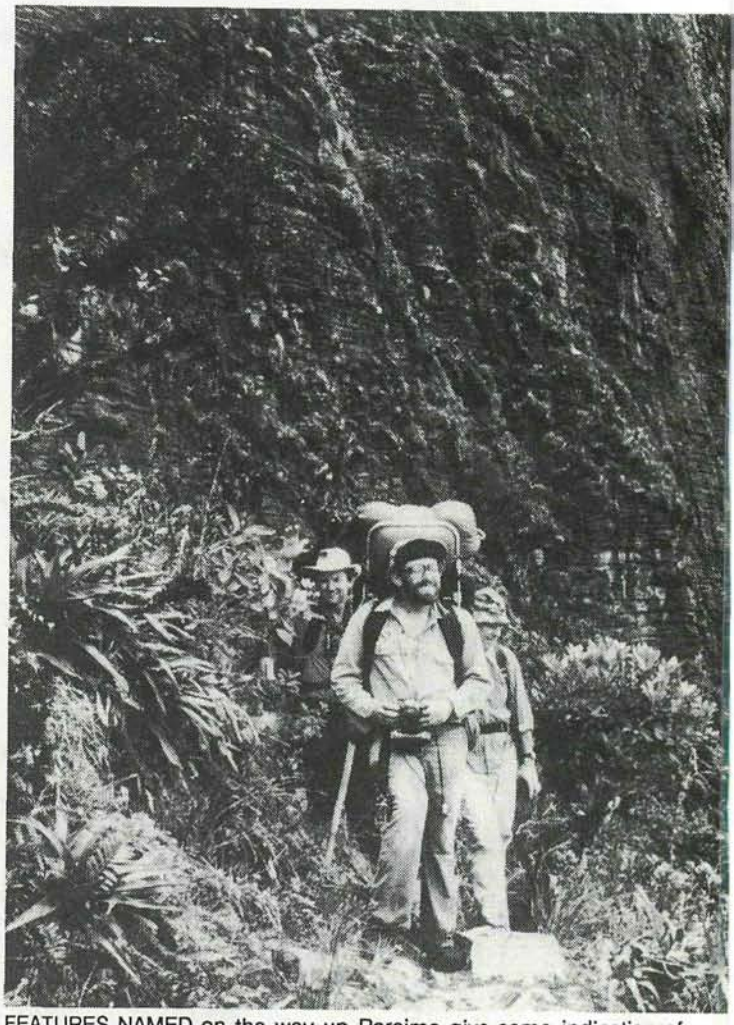
The first rocks had long been worn away when rivers flowed in from the slowly receding African continent to spread their enormous loads of sediment over eastern South America. The Precambrian granites of the Guianan-Brazilian Shield were patiently laid down, and on its northern outcrops, Nature overlaid the quartzilic sandstones of the Roraima Formation, the most spectacular geological phenomenon of the Shield. Perhaps 1,600 million years ago the sediments solidified. Near intrusions they were baked by the restless forces of the earth into true quartzites, hard enough to resist even the abrasive power of wind and water, which -- in a mere 700 million years -- would plane down the surrounding sandstones into rolling savannas.

The Andes formed in a fiery birth. The Amazon reversed its flow, and shallow coastal seas filled and drained again. Modern South America was in the making. And brooding imperviously over these changing landscapes stood the tortured escarpment of Proterozoic ramparts, isolated pink and grey flat-topped massifs called *tepuis*. Sundered for eons from the rest of the world, these desert Gibraltars dominated the skyline from Venezuela to Suriname, culminating in the highest and most famous -- Mount Roraima at 2,772 meters. (The traditional height is 9,094 feet. Other sources give 2,810m, or 9,219ft.)

The Amerindians, who came in time to dwell near it, held the strange mountain in awe. They wove it into their legends of the Flood and named it 'Ru-ru-ima' (Ever-Fruitful Mother of Waters), but could not know how apt the title was. For Roraima forms a striking watershed, its seasonal waterfalls nourishing three of the continent's great river systems: Amazon, Orinoco and Essequibo. In a hemisphere brimming with geographical wonders, there are few such comparable features.

When the first Europeans arrived, the region came to be called the Empire of Guiana, a land believed to hold fabulous riches.

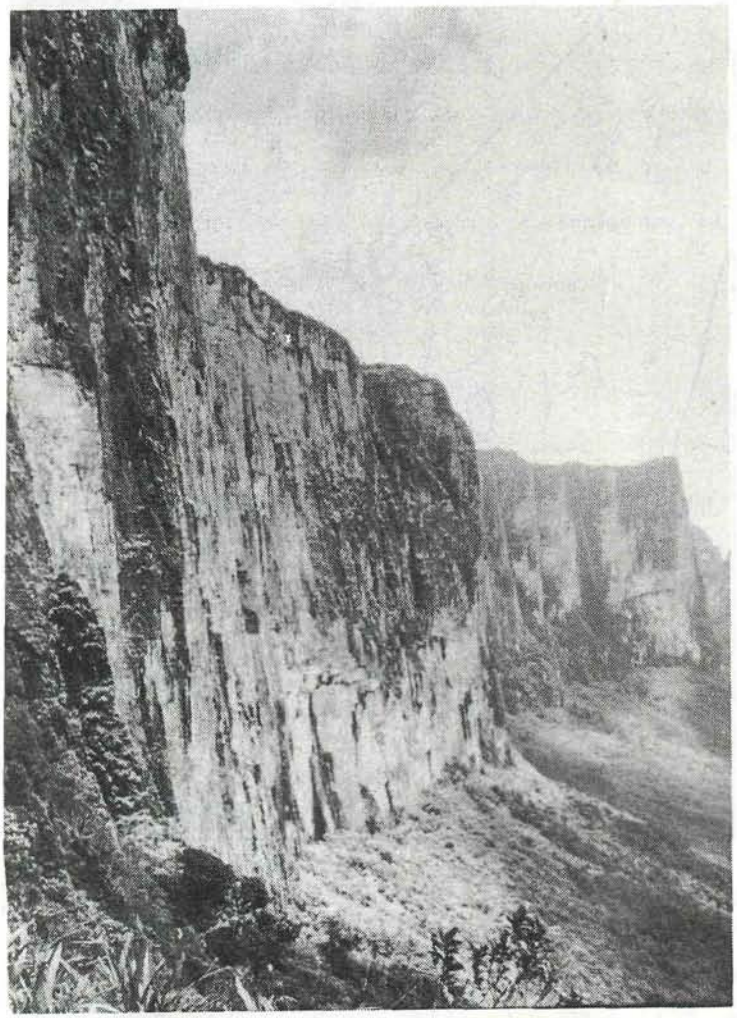
[Adventurous soldiers] shall finde there more rich and bewtiful cities, more Temples adorned with golden images...than either Cortez found in Mexico or Pacaro [Pizarro] in Piru. For Guiana is a countrey that hath yet her Maydenhead, never sackt, nor wrought, the face of the earth hath not been torne...the graves have not been opened for gold, nor their images puld down out of their Temples...



FEATURES NAMED on the way up Roraima give some indication of the Prow: Cabbage Patch, Tarantual Terrace, Africa Flake, Bottomless Chimney and Great Roof.

enthused Sir Walter Ralegh in 1595, who, despite an oft-quoted remark about a 'Mountain of Christall' which they saw 'farre off,' never came close to Roraima during his two ill-fated attempts to locate the fabled city of Manoa, home of the king 'which the spanyards call El Dorado.' But the unquenchable legend of the Gilded One drew many other brave fools (such as Pedro Malaver de Silva and Juan Martínez) into the unexplored hinterland between Amazon and Orinoco, and we will never know which forgotten conquistador may first have gazed in wonder at the Mother of Waters.

Photos by Rob Rachowiecki



After Venezuelan independence in 1830, dispute arose over borders with the new colony of British Guiana. Both neighbours claimed all the territory from the Orinoco to the Essequibo Rivers. As Venezuelan outposts quietly crept eastwards, Britain decided to explore this contentious region. Sponsored by the Royal Geographical Society, Prussian-born brothers Robert and Richard Schomburgk began a long series of expeditions to fill in the blank maps of the colony.

Robert heard reports of a remarkable mountain at Pirara settlement in 1835. He was eager to follow them up, and in November 1838 -- approaching from the Rupununi Savannahs -- he reached Roraima (the first recorded white man to do so), to find that the Mother of Waters was more than just a legend.

"Before sunrise and for half an hour after, Roraima was beautifully clear, and we saw it in all its grandeur...its steep sides rising to heights of 1,500 feet...they are as perpendicular as if erected with a plumb line," recalled Schomburgk. "I can ill-describe the magnificence of these mountains with their thundering and foaming cataracts."

He remained for 25 days in the vicinity and soon realized that the eastern wall was unscalable. He tried the southwestern corner, but lack of provisions and his porters' fear of the mountain finally forced him to turn back.

Robert's explorations continued for years, earning him a knighthood and the Society's Gold Medal in 1840. The following year, the government named him Boundary Commissioner. After tracing many of Guiana's great rivers to their sources, he pressed into the highlands -- erecting markers, blazing trees with the royal emblem and generally establishing the so-called 'Schomburgk Line' which settled any doubt in Britain's favour. The Venezuelans were far from impressed, and the bitter dispute raged for another 60 years.

Meanwhile, in 1842, he revisited Roraima with his brother. Richard, a renowned botanist, was enraptured by the land in the mountain's shadow. Before their tents lay a swamp "on which Flora had assembled her more beautiful children": dark-blue Utricularia humboldtii, charming Cleistes, yellow-robed Rapateas. The Europeans sensed Roraima's power on the first evening. Torrential rain battered their canvas tents. The Indians shivered in 52°F temperatures. When the tempest ceased, they beheld a memorable sight: under a lunar rainbow, swollen masses of water cascaded down the mighty cliffs with an unnerving sound "as if hundreds of engines were at work." By morning, the falls had shrunk to their former size, and the event seemed no more than a vivid dream.

The pioneers spent three weeks around the plateau determining its position, collecting plants and seeking a way of ascent. The Arecuna Indians who lived at its base believed that Roraima wove about herself a perpetual cloak of cloud so that no outsider would ever see her. The vigilance of the great spirit Makunaima made certain that no white man would ever set foot on the sacred summit. The Schomburgks tended to agree after finding no place to scale the forbidding cliffs, and they retired with only their botanical collection as consolation. But it was Robert's official reports and his occasional papers for the RGS that brought the mountain to the attention of the world at large. Something in the remote mystery of the unconquered *tepui* captured and held the public imagination, particularly at a time when so many of the Earth's geographic enigmas were surrendering their secrets to intrepid Victorian explorers and scientists.

Little was yet known about the mountain. No one had seen its northern end (which was guarded by dense tropical forest), so it was assumed to be a rectangle measuring about 32 X 8km (20 X 5mi) and completely protected by sheer 600-meter-

high (2,000ft) cliffs. To the west stood Mount Kukenaam -- called 'Mata Hui' by the Indians -- equally impressive and only a little smaller. They were so much akin that the natives regarded the two plateaus as one. They rested on pedestals of volcanic rock which spread out for 8km (5mi) before their talus cones merged into the jungle on the north and the rolling savannas to the south and west.

Roraima was ruled by a micro-climate unique in the region, making it one of the wettest places known. Roaring winds drove smoke-like cloud about the distant summit and fearsome electrical storms reflected off the deeply-furrowed ramparts of pink sandstone. Its height above sea level was anyone's guess. What might yet lurk hidden at the top, no one could say.

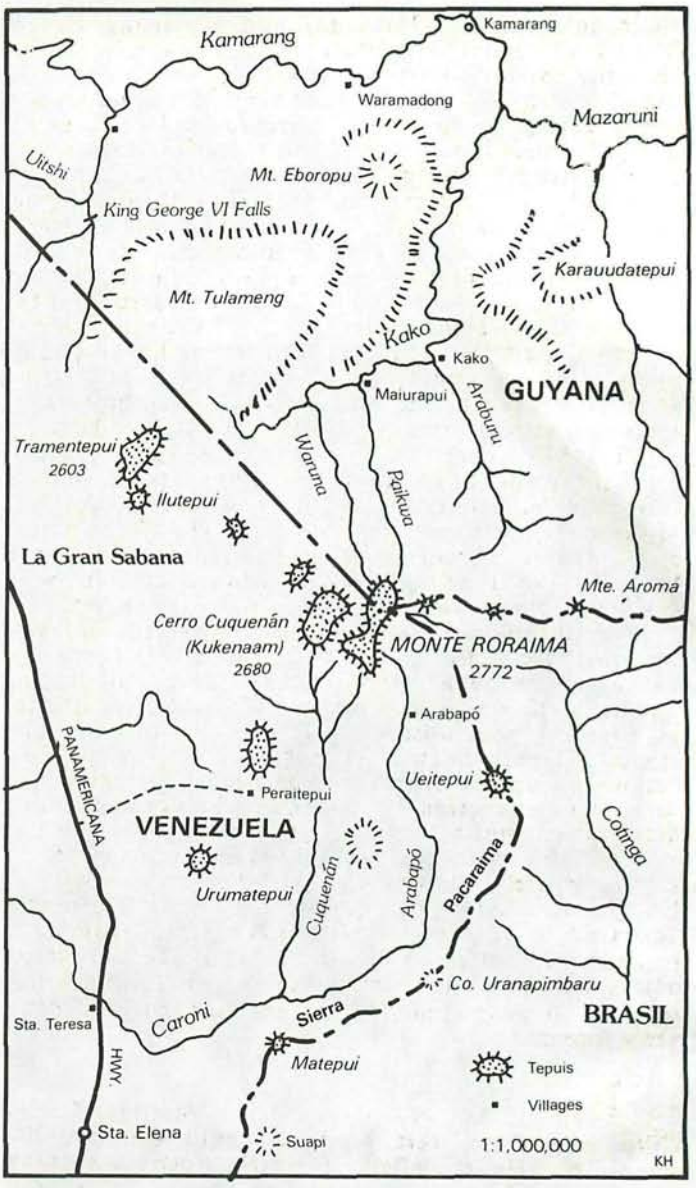
Strange places attract strange incidents. In 1845, a young Arecuna named Awakaipu -- he had lived in Georgetown, spoke English, and had worked for the Schomburgks -- suffered delusions of grandeur in which he saw himself as chief of all the British Guianan tribes. He sent word around the colony urging all those who desired to be as rich and powerful as the white men to assemble in the valley of the Kukenaam River at the foot of Roraima. A thousand Indians gathered there in July. In return for gifts, Awakaipu handed out 'magical presents' (pages from the Times which Richard Schomburgk had used to press his botanical specimens), saying that they would act as powerful charms.

He built a hut and lived there with a harem of chosen women. His madness and aloofness made him all the more awe-inspiring, and to encourage loyalty in his followers, he organized regular drinking bouts. Disobedience was punishable by death. On one such orgy, dressed in his 'robe of magic,' Awakaipu made a solomn announcement: the great spirit Makunaima had revealed that if his faithful wished to be granted white skins, they must kill each other! Only then could their released souls ascend to Roraima's summit and return resurrected in two days' time with all the knowledge of the white men.

So saying, the self-styled mystic suddenly bashed in the head of a bystander and drank his blood! All the long-standing grudges and feuds between the different tribes erupted, and on that grim night, up to 400 Indians -- men, women and children -- were massacred. The days passed, but the reborn victims did not come down from the *tepui*. After a fortnight, with hunger stalking the camp, there was a general realization that there would be no resurrection. The Indians went to Awakaipu's hut and clubbed him to death.

It is said that the lonely souls still wander the summit of Roraima. In 1864, the German botanist Karl Appun, employed by the British Guiana Museum, was the next to visit the mountain. Approaching from the Kako River on the north, he ascended to the base of the southwestern cliff. He was followed five years later by Charles Barrington Brown, who was conducting the first geological survey of the colony. Like Appun, the Englishman was forced from the mountain prematurely by a serious shortage of provisions.

In the 19th century, the basic principles of geology had been established. Interest in fossils and paleontology quickened. When the revolutionary theories of Darwin and Wallace hit the scientific world, a heated debate arose among European naturalists. What, they asked, would happen to plants and animals if isolated for thousands of years in an environment not undergoing basic geological change? If species were perpetuated by isolation, might not living remnants of an earlier age still exist? They began a search for geological formations of cataclysmic origin, places that might have trapped their flora and fauna in time. With Barrington Brown's promising reports about Roraima in the early 1870s, the *tepui* became an exciting possibility. Opponents scoffed at the idea of Jurassic reptiles cavorting about atop a South American plateau. They pointed out (correctly) that cliffs do not stop seed propagation by wind and birds, and that reptiles and many mammals could scale any barrier. Nonetheless, the idea was so novel, the possibilities so exciting, that followers flocked to the banner. The zoos of Europe and North America were ready to offer millions for a live dinosaur!



The Approaches to Roraima

But to date, the few visitors to Roraima had achieved little. Reflecting the general exasperation, the Spectator in April 1874 was moved to implore: "Will no one explore Roraima and bring us back the tidings which it has waited these thousands of years to give us?"

A government-backed response was mounted early in 1878 when colonial official Michael McTurk and J. W. Boddam-Whetham set out from Bartica to march to

their goal via the Mazaruni and Kuripang Rivers. They made a partial circuit of the mountain, noting that the soil on the south side was moister and the plants and blossoms more abundant. Roraima loomed above them, "its tower-like appearance increasing its general resemblance to a Titanic fortification a few miles in length, rising from a forest glacis." The two men and their porters carved a trail through dense vegetation around the talus base, but despite a careful inspection, they could find no practical ascent route and concluded that it was probably unconquerable, except perhaps by balloon -- if one could survive the brutal weather conditions at the top. On this journey, Boddam-Whetham was the first to gain tantalizing glimpses of the remote northwestern face. Still, there were no breaks in the mighty walls, and the summit remained as unattainable as ever.

In 1877, travellers Flint and Eddington came in from the Rupununi Savannahs. "They, too, as if some fate impelled all travellers to follow one in the wake of another, managed to ascend to the foot of the cliffs on the SE side, and being immediately driven back by want of provisions, pronounced it, with commendable caution, to be possibly inaccessible."

Ornithologist Henry Whitely arrived in 1883, reaching the base on August 5th after cutting a pathway through the thick and unyielding undergrowth which screened the plateau. His attempt at climbing was unsuccessful. In driving rain and cloud, his path missed its target -- a ledge running diagonally up the southwestern face. This route had been an attraction ever since Schomburgk had described it, but a break about halfway up seemed to rule out any chance of a ready-made stairway to the top. Whitely, however, felt the gap might be bridgeable. "After the break," he wrote, "the ascent appeared to be easy, and the top could, I fancy, be reached without much difficulty." His report sparked new hope and made the plateau even more tantalizing. Interest in geographic circles and the popular press grew intense.

Everard im Thurm, a local British Guiana magistrate, felt sure he could conquer the mountain. He travelled in North America seeking backing, and while canvassing for support in Montreal in 1884, he remarked: "I will say little here -- for I confess I am somewhat incredulous -- of the primitive forms of animals and plant life which has supposed to survive, shut out from the rest of the world by the mighty cliffs. It is a pretty idea, that of a small primeval world lost for ages up in the clouds, to be found someday."

Even without this ("in which I wish I could believe"), he convinced the BA, the RGS and the Royal Society that there was sufficient scientific interest on Roraima to warrent financial sponsorship. With his partner Harry Perkins -- Assistant Crown Surveyor for the colony -- he planned a new approach route up the Potaro River. Aware for the lack of game and supplies in the region, which had forced back all earlier attempts, the men took a large supply of tinned food and timed their arrival with the harvesting season of the Indian cassava crops, even though this brought them close to the onset of the rainy season.

At Bartica, they encountered an orchid collector named Siedal who had visited Roraima in February and brought back specimens of the exotic Cattlava. These had not survived the journey, and he was now returning for more. Siedal left to travel up the Mazaruni, and the official party paddled on up the Potaro to the old mission at Chinebowie, just above the spectacular Fall of Kaieteur (or, more correctly, Kaietuk).

They engaged porters and set out on November 14th, following the Schomburgks' footsteps along the edge of the highlands until they crossed the Rio Ireng into Brazil. Despite their guides' confusion, it was now merely a matter of following the sporadic line of *tepuis* -- 'the sentinals of the Lost World, a series of blue mountain peaks, as grotesque as Roraima and Kukenaam, but smaller' (as a later visitor wrote) -- until they attained the poor Arecuna village of Turoiking on the Rio Arabapo, barely 10km (6mi) from their objective.

Around them, flattened knolls and yellow, arroyo-eroded plains pocked with anthills and worn rock outcrops sloped away into Venezuela. Bare spectral trees rose from patches of sandy swamp. The party was constantly on the alert against the many snakes that infested the dry grassland: rattlesnakes, feared bushmasters and the colorful *labarrias* -- the swift and deadly fer-de-lance.

Im Thurm learned upon arrival that another white man had come from the north and bought up all the supplies and porters in the vicinity. This, of course, was Siedal. On knowing of their presence, he sent down several Indians to guide the Englishmen to the rough hut he had built about 6km up the slope at 1,646m (5,400ft). The newcomers constructed another nearby, the porters added a contribution, and "before we left the place it had become quite a large and picturesque settlement," which faced the swamp that Richard Schomburgk had called "a botanical El Dorado" -- where riotous blossoms and sombre bromeliads jostled for space, and delicate pitcher plants patiently awaited a tasty insect.

Im Thurm and Perkins were well aware that most earlier attempts at climbing Roraima had been directed at the ledge which now faced them -- a thin dark smudge running diagonally from right to left up the ruddy southwestern face of the plateau. Gazing at it from their camp, they failed to convince themselves of its practicability. Nevertheless, they moved forward on December 10th, cutting a path through the increasingly cold and damp cloud forest. The Indians were put to work widening and extending the trail. On the 14th, the cliff was reached, so abrupt that they could reach forward and touch it. It soared up 600m into the clouds, overhanging slightly so that water falling from countless points near the top reached the base two meters out, drenching everything in a freezing mist. Whitely's highest point was marked by machete cuts on nearby trees. Perkin's boiling-point thermometer indicated a height of 2,364m (7,756ft).

The assault on the ledge commenced in light rain. The lower part was broken and disjointed, and the group was forced to scramble over and around boulders and muddy tree roots covered in wet slime. To men accustomed to the heat of the tropics, it was so cold that the vegetation was like 'sponges filled with iced water.' Hand and feet were soon numb, the rain came down in torrents, and the decision was made to postpone the attempt until a more suitable day.

The following Thursday dawned promisingly. They made good time on the cleared path and reached the ledge at 9 a.m. Again, they entered a world of green slimy things. Reluctantly, the Indian porters followed them up into the clouds, glad that the increasing drop to the left was blotted out by a swirling carpet of whiteness.

It was not an especially treacherous climb, for in

places the 'ledge' was 12 meters wide, but it was broken and loose. About two-thirds of the way up, they came to the interruption -- a waterfall plunging from the summit had carved a gap in the rock-slip. This, although tricky, proved surmountable, and the way ('which was very wearisome and difficult though at no point dangerous') was clear to the top. All three men -- enthusiastic botanists -- were so occupied in seeking each new treasure that they had almost gained the summit before realizing it. The final steps were taken at 1 p.m. on December 18th, 1884, and im Thurm, Perkins and Siedel stood atop the plateau.

Roraima had been conquered!

"The first impression was one of inability mentally to grasp such surroundings," im Thurm later recalled. The top of the ledge funnelled for 50 meters through a troughlike cleft in the rocks bordered by a jumble of weathered, blackened sandstone, to open into a shallow amphitheater walled in by tier upon tier of red rock blackened by algae.

"All around were pinnacles of rock of seemingly impossibly fantastic shapes, and between the rocks were level spaces...of pure yellow sand, with streamlets and little waterfalls and pools." The ridges separating these depressions had been carved by millenia of erosion into weird shapes: umbrellas, dragons, fortresses, cannon. Cracks and fissures yawned everywhere. There were many fossil ripple marks in the dissected sandstone...but not a stegosaurus or pterodactyl was to be seen. "Here and there," wrote im Thurm, "were small shrubs in forms like minature trees [but] not a tree was there -- no animal life was visible or, it seemed, so intensesly quiet and undisturbed did the place look, ever had been there."

Yet the prospect, viewed through swirling cloud, was suitably prehistoric. Everywhere was water: swamps sprawled leadenly in the mist, pools stared bleakly at the hidden sky, ferns dripped disconsolately in the heavy silence. The plateau was far from flat. There were few places where walking was not difficult amid the stony mazes and humus bogs. Although only $5^{o}10'$ from the Equator, Perkin's thermometer stood at $54^{o}F$ ($12^{o}C$). Adjusted, it indicated a height of 8,600ft (2,621m). He estimated that of nearby Kukenaam at 7,856ft (2,395m).

As far as could be seen from the highest pinnacles, Roraima stretched northwards in the same eerie world of stone and water. The men ranged as far as they were able, but already the afternoon was far advanced. The weather closed in and cyclonic wind tore at their clothing. None relished the prospect of a freezing night on the strange summit. After three hours, they carefully retraced their path to the welcoming shelter of their huts far below. On Boxing Day -- as the rains advanced -- the government team departed by the route they had come. Siedal returned via the Mazaruni, taking exactly the same time to reach Bartica by the northern trail. A few months later, they presented their reports and specimens to an eagerly awaiting world.

The proponents of a possible primordial world were not disheartened by the lifelessness of the plateau. Only a tiny fraction of the summit's 65 km^2 had been seen. Im Thurm, himself, admitted: "If is impossible to reach the summit early enough in the day to explore more than a short distance from the point reached." Since there were no trees from which to construct a shelter, make a fire or sling hammocks, everything would have to be hauled up the ledge before visitors could be self-sufficient enought to make a more extensive investigation. Therefore, in many quarters, optimism remained high that the Age of Dinosaurs might yet linger. With a route open to the top, professionals should soon begin to flock to the mountain to probe and catalogue and photograph its wonderland of mysteries.

Space does not allow descriptions of the expeditions which followed in the next few decades. Botanists and naturalists ultimately discovered a whole new range of plants and insects unknown to science. Of the 85 species of birds, only 22 were known in the neighboring tropical areas. Thirty-nine had close relatives in the subtropical zones of the Andes. After the tremendous climatic modifications in the Quaternary Period of the last two million years, the ancestors of these winged Andean visitors had been isolated around Roraima, adapting to the unique region, just waiting to be found by eager scientists and climbers. Access to the *tepui* was still only from Venezuelan territory, but scientific parties went unhindered by the diplomatic wrangles over the region, and specimens and voluminous reports accumulated and added to the growing knowledge about Roraima and its elusive inhabitants. Makeshift methods were used to span the break in the ledge and camping gear, advances in tinned food, and scientific instruments enabled these new explorers to do a more thorough job of investigation.

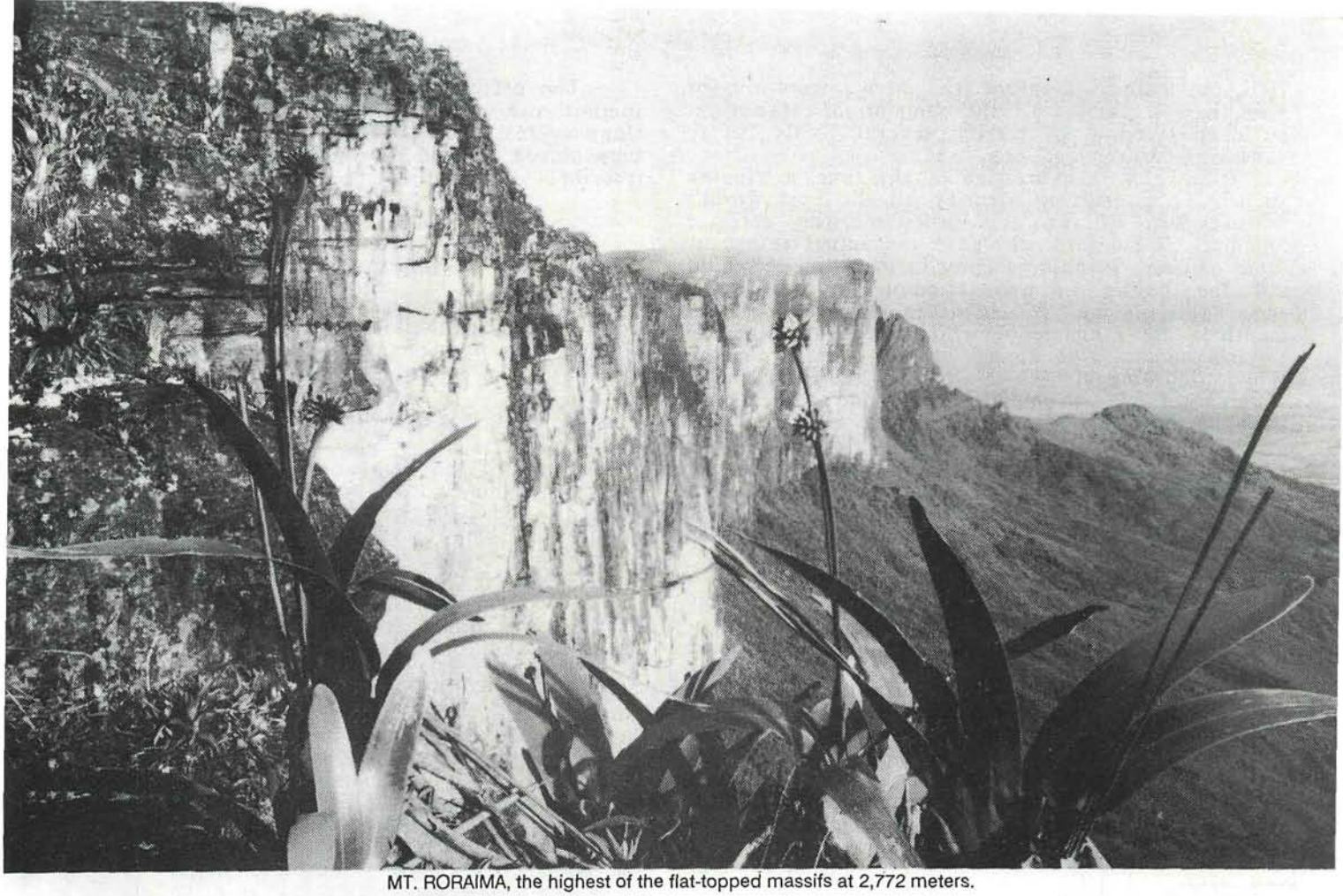
Despite increasing sophistication, there were still dangers for visitors: little local provisions, fickle weather, accidents, snake-bite. J. J. Quelch, on his second visit in 1898, was obliged to support himself for nine bleak days isolated on the summit in a primitive shelter of rock. True to Victorian tradition, he spent the enforced leisure carefully exploring his misty prison. He noted that, despite the cloud belt that wells up all around the mountain each day at dawn and seems to engulf the entire massif, sunlight still bathed the summit pleasantly -- until banished by unpredictable squalls of wind and rain.

During this period, the ownership of the area was in hot dispute. Britain clung steadfastly to the Schomburgk Line, and Venezuela maintained that she had inherited all the old Spanish provinces of Guayana as far as the Essequibo River. Things came to a head in 1895 when the Venezuelans seized a British police post on a tributary of the Cuyuni. Into the picture strode United States President Cleveland, shouting: "Monroe Doctrine," and his unlooked-for intervention almost created war between Britain and America. After prolonged negotiations, a treaty was effected in 1897 providing for arbitration by a tribunal of two English and two American members under a Russian chairman. Their award -- announced in 1899 -- closely followed the Schomburgk Line but gave Venezuela the delta of the Orinoco.

In 1901, King Victor Emmanuel of Italy was asked to rule on the long-standing Brazilian boundary question. His line also closely followed that of Schomburgk and made Roraima a natural point for the three borders to converge on. The frontier was delimitated on the ground by an Anglo-Venezuelan Commission between 1901-05. They placed their joint marker on the summit (at $5^{o}10'09.6N$ and $60^{o}45'58.2W$) of the Mother of Waters and worked outwards into the rugged highlands.

For three decades thereafter there was relative peace.

The increasing knowledge about Roraima argued against any major life forms -- ancient or modern -- still surviving on the summit. Hectares of ripple-waves were discovered, but countless cons of un-



MT. RORAIMA, the highest of the flat-topped massifs at 2,772 meters.

ceasing erosion had effectively destroyed any bones or other physical evidence of prehistoric life. Nonetheless, there were still those who believed...or wished to believe.

Among those who had followed the debate and listened avidly to Sir Everard im Thurm's lectures was Sir Arthur Conan Doyle, whose Sherlock Holmes stories were now so popular that he had given up his medical career in favor of writing. In the premise of a living prehistoric world, he spotted the basis for a good novel. Roraima supplied him with some ideas on what such a world might look like, but he still sought further inspiration. He met with Major (later Colonel) Percy Fawcett in London in 1910. The famous explorer, just returned from surveying the Brazilian-Bolivian border, had taken photographs of the Serra Ricardo Franco. His descriptions of the remote, sheer-sided, cloud-wreathed range near Mato Grosso City were carefully noted by Doyle who, as a fellow spiritualist, was sympathetic to Fawcett's belief in lost worlds and cities waiting to be found in the interior of South America. He was also impressed by reports from William Denton, former Professor of Geology at Boston University, who believed he had seen astonishing images of ancient Hawaii after holding a piece of lava from Kilauea. Denton's wife, on inspecting a mastodon tooth, had a dream in which she seemed to become the creature itself. Doyle was so taken with recently-discovered iguanodon tracks that he had plaster casts made for his study in 1911.

Everything came together. After consulting with the eminent zoologist Edwin Ray Lankester, the author sat down to write his next book. In 1912, he published The Lost World: Being an Account of the Recent Amazing Adventures of Professor E. Challanger, Lord John Roxton, Professor Summerlee, and Mr. Ed Malone of the Daily Gazette. Although the critics missed much of the ironic humor, The Lost World was an immediate and perennial success, considered by many as Conan Doyle's finest piece of fiction.

In journalistic fashion, it tells of an expedition to a lost South American plateau. Challenger, on a previous visit, swears he has seen a living pterodactyl there. The resulting ridicule of Professor Summerlee and the Zoological Institute impells the short-tempered academic to lead a small party to Manaus, then "upstream for some days" before a long trek across jungle and savanna. Finally:

We were within seven miles of an enormous line of ruddy cliffs which encircled, beyond all doubt, the plateau of which Professor Challenger spoke. Their heights... running up in parts to at least a thousand feet, were curiously striated. The summit showed every sign of a luxuriant vegetation.

At the end of the plateau is a "high, thin pinnacle of rock...like a broad red church spire, the top of it being level with the plateau, but a great chasm gaping between," (recorded Ed Malone in his notebook). This proves easier to climb, and by the expediency of felling a tree as a bridge, the party crosses to the Lost World.

Its description is not unlike that of Roraima's summit, save that it slopes inwards to a vast monster-filled lake. After many lively adventures with prehistoric beasts and a tribe of apemen, the travelers return to London, bringing with them a partly grown pterodactyl. But while being exhibited at Queen's

Hall, the leathery creature (the later inspiration for King Kong), startled by the commotion, escapes out an open window to terrify several locals before vanishing forever.

It was, in an expression of the time, a 'ripping yarn.' To attempt to identify all the Lost World's features with Roraima is unprofitable, for Professor Summerlee's final speech "gave the actual course of their journey, witholding any information as would aid the public in any attempt to locate this remarkable plateau." One feature, however, deserves mention: the pinnacle by which access is gained to Doyle's mountain is almost certainly based on the 'Towashing Pinnacle' which stands at the southern tip of Mt. Roraima. Compare Ed Malone's description with that of Everard im Thurm:

From the cliffs where, at its southernmost point, it rises from these woods, a portion has at some time been vertically detached, and this still stands, a rude obelisk of naked rock rising out of the forest to tower above the closely neighbouring cliff of Roraima.

It is, nevertheless, also possible to detect elements of both Roraima and Ricardo Franco in the novel -- quite apart from a master storyteller's keen imagination.

The Lost World, then, was not based exclusively on Roraima, but the name stuck, and from that time, the public automatically associated the mountain with the title. A film version was made in 1925. In an appallingly modernized remake of 1960 (complete with Jill St. John and poodle, no less), the aerial stock shots of the Mother of Waters no doubt also helped to fix the association in people's minds.

Right or wrong, Roraima will always be thought of as the Lost World.

The curious as well as the scientist began to visit the plateau as the new century progressed, although the region's isolation still kept away all but the most determined. In January 1916, the one-time Governor of British Guiana, Sir Cecil Clementi, and his wife Pamela climbed the mountain. Lady Clementi -- the first woman to reach the summit -- left an excellent record of their journey:

The climb through the forest belt is the only disagreeable part of the whole ascent...after reaching the ledge the path is still in jungle for a little way...but gradually the ledge widens and the forest drops away, so that one gets a glorious view of the country, spread out below like a great green sea.
A troublesome feature of the ledge is that it has three V-shaped descents in it. These are very steep and we had to slide down, clinging to every roote, bush or stone we could catch hold of. Getting up again was of course more difficult, and in the second place we used a rope. It could be managed without one save for the baggage, which must be pulled up. AT the third dip the ledge passes under a waterfall...on this occasion it was only falling in drops like a heavy and ice-cold rain shower. The rock is very slippery but it has weathered into convenient little steps and presents no real difficulty. From this point the ascent is direct and steep, and in three hours from the foot of the cliff, we reached the escarpment.

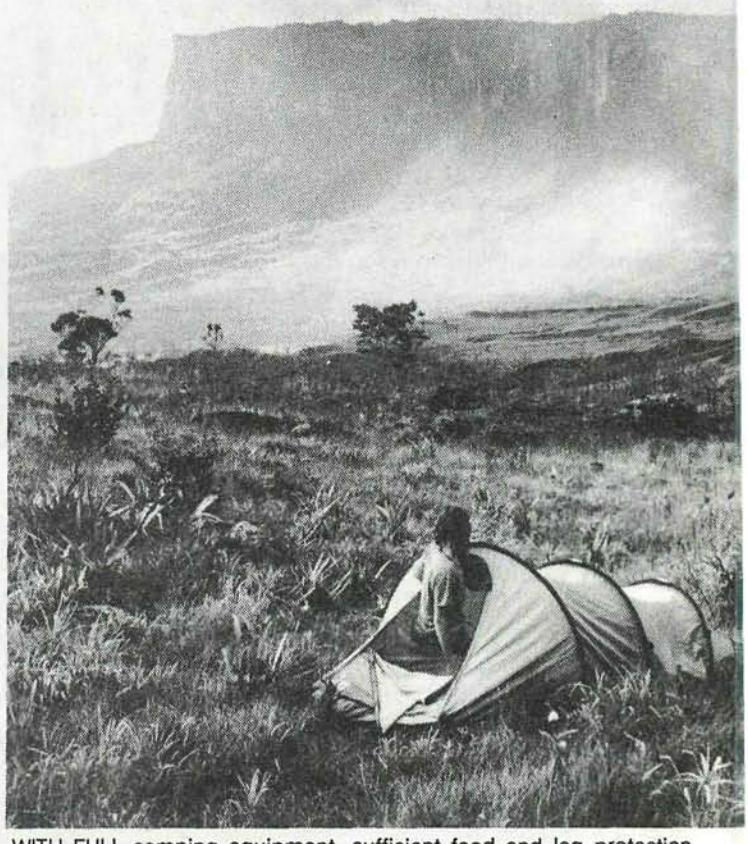
Roraima was kindly disposed towards them "for we had the rare luck to pick an absolutely still, cloudless evening in which to look about us at the extraordinary scene."

The official party spent a cold night on the summit and explored until 11 a.m. the next day (January 16) before descending. But before doing so, they placed on Summit Camp a small brass plaque inscribed:

C.C. and P.C.
Govt Secy and Wife
Visited Jany 1916
God save the King

This is still almost the only sign of man's visitations on the weathered tabletop.

A brief look at the Lee Garnett Day Expedition of



WITH FULL camping equipment, sufficient food and leg protection against snakes, the journey presents no real difficulties.

the American Museum of Natural History will serve to illustrate the types of finds and observations encountered by similar expeditions to Roraima since its conquest a century ago.

This party, under the command of curator G. H. Tate, approached the *Tepui* in November 1927 in order to follow up the Museum's earlier biological traverse under Cramption in 1919. From Boa Vista, they came up the Rios Branco and Cotinga, meeting up at Limao with a group led by the famous Brazilian 'Champion of the Indians,' Marshall Candido Rondon, who was undertaking a regional survey of resources and living conditions among the Indians. Together they crossed the hot, arid grassland to Barro Village on the Rio Miang, crossed into Venezuela, skirted Mt. Weitepu and ascended the Kukenaam River to their goal. They settled into the Arecuna village of Paulo, with Rondon's guidance being able to make their aquaintance and study them better than most foreign

expeditions.

The forest screen around the mountain's foothills had been badly damaged by bushfires a few years before. Secondary growth of bracken and tussock now lapped about the bases of forlornly bare white tree trunks, amid which slithered countless snakes and the occasional shambling 'ant-bear' (Myrmecophaga jubata), a sort of overgrown anteater. The Rondon party had little time and began clearing the path to Roraima. It was relatively easy to open for the 15km for Paulo, and for some days, streams of porters ferried baggage up to the base of the cliff. On November 17th, the Americans and Brazilians began the climb. Tate wrote:

The ledge, which from Paulo looked so insecure and tiny, proved to be a broad slope of soil and rock detritus large enough to bear a good growth of forest, and for the greater part of the climb one scarcely realises that there is an abyss fifty feet to the left. During the drought the ledge vegetation undoubtedly shrivelled to tinder, for the fires flared up through trees and bush to the very top. It even girdled one of the sandstone hillocks on the summit. Wonderful it must have been to see old Roraima's cliffs ablaze!

And so they entered the 'Lost World.' The castellated cliffs -- like minature tablelands (called *morros* by the Brazilians) -- which break up the summit, loomed around them. These proved so abrasive that shoes were ruined within a few days. Tate's dog had its claws worn down to the paws by the time they left the plateau. From the center of the southwest cliff, a great rift ran inland to the Central Swamp, the largest on Roraima, where star-like vermilion flowers blossomed from the tussocks in the evil-looking pools. Damp, sodden bushes (Bonnetia roraimae) shielded meter-tall Sarracenias -- beautiful if rapacious pitcher plants -- and graceful bell-shaped Campanulas.

The expedition members set about following in the raptious footsteps of Quelch, McConnell, Clementi and others who had already collected several rare or unique forms of birds, flowers and insects here. Tate spent 12 days on the summit. With a good food supply and specially-made tents, they were decidedly more comfortable than many of their predecessors.

They set almost 300 traps in the many cracks and ponds on the summit. "In every tenth trap or so I found some creature whose like occurs nowhere else in the world," enthused the mammalogist. Most numerous were the tiny black toads who seemed to thrive in the damp, misty environment. "With nightfall and the lighting of the gasoline lamps, came a host of night moths, daddy longlegs and flying creatures that, despite our search, we seldom found by day."

In two extensive weeks of collecting, the LGD Expedition found 11 representatives of birds, three types of mammals and many frog and insect species on the summit alone. In the cloud forest of the foothills, they added even more to their collection bags. It was a resounding success and killed forever the idea of dinosaurs living there. Perfectly preserved surface ripple marks of Paleozoic waters confirmed that Roraima had once been at the bottom of a vast shallow lake, but the prehistoric monsters had long since departed into oblivion.

Final fieldwork on marking the international frontiers around the mountain began in 1932 when a British Guiana Commission met those of Brazil and Venezuela at Roraima. They found that the earlier tri-juntional marker had been wrongly placed, and (with rare co-operation from Venezuela) the small concrete survey pillar was relocated at a point near the eastern cliff. A small joke was also perpetrated which would not come to light for 24 years. The survey was fraught with problems. At one point, the Brazilian colonel in charge of his party almost fought a duel with the British leader, Mr. Cunningham. Most of the latter's team fell ill with beriberi -- somewhat mysteriously since their diet was well-balanced -- and after the loss of several lives, they were forced back in 1934. Next July, the Royal Engineers took over, completing the job and gaining the glory. The frontiers of Brazil and Guiana were finally linked up to everyone's satisfaction on May 10th, 1938.

In December of that year, well known U.S. zoologist Paul Zahl left Georgetown on a quest for the vicious *paraponera* species of ant. Accompanying him was Englishman Geoffrey Chislett. American bush pilot Art Williams -- who had done so much useful work with the Boundary Commission -- flew them in his gragile Ireland Wasp hydroplane overland to Kamerang. Since Roraima had never been flown over, they continued up the Kako River. Like a giant aircraft carrier, the plateau came into sight far ahead, but clouds barred their way, and Zahl had himself landed at the remote mission of Waramadong. Here they organized a safari and set off up the Uitshi River, living for some weeks in its valley (where they discovered and named the King George VI Falls) before passing into Venezuela.

They trekked around the western edge of Kukenaam and, with their Indian porters daily becoming more desirous of returning home, beheld the red fortress walls of Roraima clear for a few minutes in the pale sunlight. "But soon jealous Nature wove another gossamer shroud and reclaimed her grotesque and ungainly child." The party worked its way up the ledge to be greeted at the summit by a bitter wind driving a fierce, freezing rain through their bodies, especially those of the half-naked porters. Despite the miserable conditions, Zahl and Chislett ranged far and wide. They found that a huge gap had been eaten into Roraima's western side. Kukenaam was not strictly divorced from its bigger sister but joined by a knife-edged ridge. The gap between -- which Tate had called 'The Notch' -- they rechristened 'The Gateway to Hell,' because smoky billows of wind-driven cloud belched from it like the vey portals of Dante's Inferno.

"Within a hundred yards of the edge," wrote Zahl, "erosion has scoured out the gullies into immense rifts. The cracks parallel with the cliff, varying in width from a few inches to many feet, forecast future great rock falls." For any visitor priviledged to be nearby, such a sight promised to be spectacular, indeed.

After six hours on the summit, the clouds came down. Suddenly, there was a very real danger of becoming lost. Zahl was not the first or last person to be conscious of the 600-meter drop yawning omiously somewhere in the chilly fog ahead. Rather than risk a night on the summit, they stumbled around until they found the tunnel leading to the ledge and reached their base just after nightfall. Collecting his ants along the way, Paul Zahl returned to Georgetown delighted to have experienced such a unique world.

Many others have visited Roraima, each writing their observations and contributing to the growing English-language literature about the region. Various Latin American expeditions and individuals have also naturally contributed much to

the work, but since this article is concerned with English-readers, these have not been dealt with. As one recent British mountaineer remarked: "Venezuelans don't count."!

Englishman Michael Swan climbed to the Mother of Waters in 1956. While on the summit, he came across the skull of a large animal with cow-like horns:

I knew that there was no evidence of any animal larger than a rodent ever having lived on the plateau. We began a systematic search for other bones. We found nothing...my excitement grew as I photographed the skull from every angle. Would they believe me in Georgetown when I told them of my wonderful discovery?

Back in the capital, he confided to Commissioner Jimmy Bamford who smiled slyly and said: "So it has taken 24 years to work. When I was on the Boundary Commission [in the 1930s], one of the Venezuelans took a cow's head up to the summit and planted it for a joke. Hoped some ass would fall for it someday and make a still bigger fool of himself."

And with that revelation, the world of Roraima dinosaurs crumbled forever.

We have naturally concentrated on the only access route to Roraima's summit until now. The boundary question had flared again at Guyanese independence in 1966. Since access was through unfriendly Venezuela, the Guyana government made a number of attempts to find a climbable route from its own territory. Despite wide surveys, the cliffs of the mountain revealed no convenient rock slip or ledge like that in the south. The best bet seemed to be the 'Prow,' the very northern knife-edged tip of Roraima. Guarding it, however, was a carpet of brutally thick rainforest, an incredibly wet climate, and the green, rank expanse of a morass called El Dorado Swamp. If that was breached, there was the Prow itself -- a sheer 500m corniche of slime-choked granite about which even the most optimistic climbers were dubious.

Guyanese resident Adrian Thompson had blazed a trail in 1956 from the Maiurapi Savannah to the Paikwa River. P. H. Bailey of the British Guiana Geological Survey followed the Waruma River up to the northwestern face of Roraima in 1958, but gave up all hope of scaling the Prow. In 1963, the Bangor Expedition -- which included Adrian Cowell of Xingu fame -- scaled Roraima and also Kukenaam, which they classed as 'moderate but strenuous.' Kukenaam's summit was similar to its neighbor's, but less high, less broken and less eroded.

In an attempt to bypass obstacles, a group parachuted into El Dorado Swamp in 1971. It was not a huge success, and a planned attempt to parachute onto the summit was called off. But Guyana still wanted access to its own 40% of the plateau, both for nationalistic reasons and -- more ominously -- for military ones. The rejuvinated boundary dispute was causing much ill-feeling, and Georgetown had visions of Venezuelan troops 'invading' from Roraima! They wished especially to know if the northern end of the summit could support a landing ground -- should such a facility become necessary.

Adrian Warren led a U.K. expedition in 1971 which succeeded in getting to the base of the Prow. It was a large undertaking and did much scientific study -- including discovering the Roraima Emerald Hummingbird, an exquisite creature unique to this tiny corner of the world -- but the area was almost flooded from unusually heavy rains. "Mist nets, which they had put up to catch bats, actually contained fish the following morning." Under the circumstances, Warren cancelled any attempt at attacking the Prow.

The first try was made in 1972 by John Streetly and Bev Clark, but they only succeeded in climbing a short way. Streetly was determined. With Adrian Thompson, he made a reconnaissance of the Paikwa River the next year, trying to find a better approach to the North Ridge, the gateway to the Wall. They flew around Roraima, then left Maiurapi to tramp over savannah, scrub and forest towards the *tepui*. The bush was hostile. Swamps reached out to pull them down. Rattlesnakes slithered everywhere.

WALKING is still the time honored method of getting to Roraima, the Mother of Waters.

Eventually, it was decided that Bailey's earlier route up the Waruma was still the most practical.

This paved the way for the 'BBC Roraima Expedition to the Lost World 1973.' Encouraged by the Guyanese Government, a team of world-class British mountaineers, accompanied by a two-man camera crew, arrived in Georgetwon in early October. The government had great plans for the expedition. Ever resourceful, the Guyana Post Office planned to set up a 'post office' by helicopter on the sumit to issue first-day covers when the climbers appeared over the top. (This idea collapsed when it was discovered that without jet power, the machine could not even reach the 9,000-foot roof of the mountain!)

In Georgetown, the six climbers -- Hamish MacInnes, Don Whillans, Joe Brown, Julian 'Mo' Anthoine, Neil McCallum and Mike Thompson (the last two did not make the final ascent) -- were joined by two scientists, members of the Guyana Defense Forces (GDF) and two government 'spies.' They flew to Kamarang, then canoed up the Waruma River, using Bailey's old rive camps. After a tough slog, they entered El Dorado Swamp, a series of marshes and treacherous sand which "comes straight out of The Day of the Triffids." Things here were wet and slimy, but the higher cloud forest was even worse. A coating of mud from head to foot became a way of life.

The expected helicopter supply drop failed to arrive and fever invaded the camp, but they persevered to the very base of the Prow and began the ascent. For over two weeks, the four mountaineers battled everything Roraima could throw against them, moving a little higher each day while the film crew tracked them with telephoto lenses from the camp in El Dorado. Thirty meters was considered a phenomenal day's progress.

Bromeliads extended out from every available niche -- they were slimy, unstable and filled with 'wildlife.' Every hand hold had to be inspected before using, for the cliff was alive with spiders and scorpions. After rain, the wall ran with cascading water and mud. They often needed to jumar clear of the face, especially when many pitches were no more than vertical mud which clogged even the teeth of the jumar clips. The rock surface changed unpredictably: too hard for bolts one day, too flaky the risk hammering in pegs the next. RURPS -- tiny pitons of high quality nickel steel ("whose holding power is definitely more psychological than real") had often to be resorted to.

Features named on the way up give some indication of the Prow: Cabbage Patch, Tarantula Terrace, Africa Flake, Bottomless Chimney. Of one point -- swinging out over the 'Great Roof' -- McInnes wrote: "It was the most frightening place any of us had ever been on rock, or rather, hanging off rock." And the Bottomless Chimney, with its vertical panoramic view to El Dorado 450m below, was "wet, vegetated and thoroughly nasty." All four climbers, veterans of most of the world's major peaks, voted the Prow the most gruelling and uncomfortable ascent of their careers. They were assailed by debilitating coldness and freezing spray, falling masses of vegetation and soil, and threatened by unsociable tarantulas.

But at last, the summit lay before them. MacInnes recalled: "It was a dark bare table top, variegated by tiny shallow pools and sunken gardens. I felt as if I had awakened from a nightmare: arriving in heaven after that climb from hell." At 1330 hours on November 11th, 1973, the codeword ("The sky is clear") was flashed back to Georgetown, and the news announced to the world.

Roraima's forbidding defenses had been breached for the second time.

While 3,000 first-day covers were being furiously franked and enveloped down at Camp Seven and a Half, the four men explored their surroundings in glorious sunshine:

We saw a magnificent panorama of mesas: a weird contorted skyline of grotesque sandstone figures towards the Venezuelan part of the summit...We gazed into shallow pools, which -- for the first time -- reflected man...For me, Roraima is still one of the wonders of the world.

After four short hours, the weather closed in. The job was done, and it was time to return. Out of necessity, the frightening descent was made abseiling down on a single corlene rope. And then it was all over. Man had again successfully challenged the Mother of Waters and her guardian spirit Makunaima.

The GDF representative questioned them about the flatness of the summit -- was it suitable for an airstrip? It confirmed their suspicions that the expedition was being used politically.

"Did you see any sign of troops?"

"No, nothing but frogs," replied MacInnes. "It was nice up there."

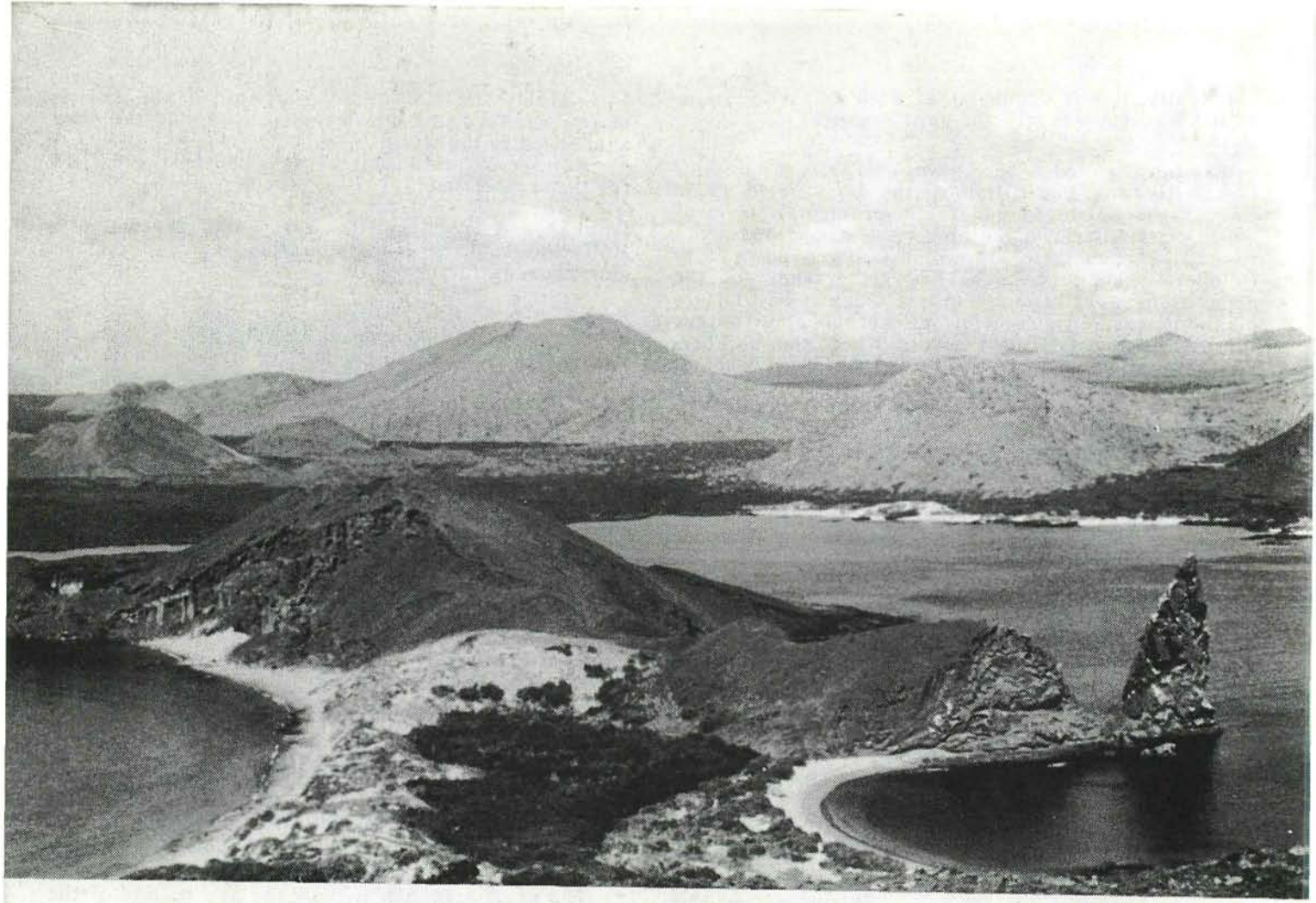
And what of Roraima today? Any future attempts at the massive walls will require full-scale expeditions -- with all that implies in bureaucracy-ridden South America. Nothing seems to have come of rumors that the Venezuelans were planning to run guided tours to the *tepui*. And for those who do not have the finances to charter an aircraft, the time-honored method of walking is still the only way of arrival.

The usual approach is from the new section of the Panamerican Highway which links Caracas and Manaus. The commandant of San Ignacio's police post (50km north of Santa Elena de Uairen -- the best source of provisions) asks all travelers, for safety reasons, to report their plans in advance. Ten kilometers further north, at the small village of San Francisco de Yuruani, a dirt track runs east across the savannah to Peraitepui, an Amerindian village of wattle and daub huts with no shops or facilities, although the headman will provide a hut for travelers to sleep in.

A guide from the village is recommended for the two-day trek to Roraima. From the heights past Peraitepui, the trail descends across grassland and valleys until climbing to a grassy meadow -- ideal for camping -- on the foothils of the Roraima-Kukenaam massif. The climb through the forest and up the ledge requires energy rather than skill. With modern, lightweight camping gear, today's climbers can easily camp atop the eerie plateau -- keeping a wary eye on the frequent electrical storms which liven up a night on the summit.

With full camping equipment, sufficient food, common sense and leg protection against snakes, the journey to the Mother of Waters presents no real difficulties. Her remoteness still limits the number of visitors. It is, therefore, hoped that some readers will make the effort to reach this unique region. One way or another, it will be an experience they will never forget. ■

KEVIN HEALEY, creator of the widely acclaimed Contemporary Reference Map of South America *and other South American maps, is a frequent contributor to the "South American Explorer."*



THE VIEW from Isla Bartólome shows sand dune vegetation in foreground, Pinnacle Rock to right and Isla Santiago in the Background. Note fresh lava flow joining together weathered hills.

Plants of the Galapagos

By Eileen K. Schofield

PHOTOS BY AUTHOR

The Galapagos Islands are famous for their giant tortoises, swimming iguanas and flightless birds. Less well known but just as fascinating are Galapagos plants, ranging from cacti to tree ferns.

Located 600 miles west of Ecuador, right on the equator, the Galapagos Islands enjoy a moderate climate year round. December through April brings some rain; the remaining months are dry. During the dry months, cloud cover on the tops of higher islands (3,000 to 4,500 feet) provides humidity for vegetation.

Entirely volcanic, the islands range in age from 1 to 4 million years old. Bare lava flows, dating from the early 1900s, give an idea how the islands looked when they first emerged from the ocean. All of the islands' plants originated from some mainland area, mostly western South America. Birds are the major seed carriers, bringing them internally or stuck to their feathers. The wind also blows in tiny spores and seeds with tufts of hair to help them stay aloft. Seeds also arrive in fruits that float across the ocean. In modern times, humans have brought in new plants, unfortunately often unwelcome weeds.

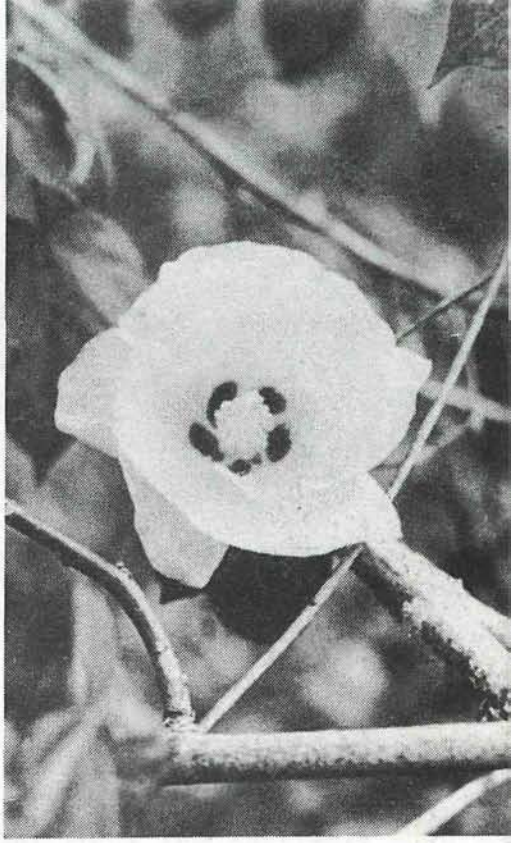
A visitor to the Galapagos has the opportunity to see the many unusual native plants. Trees line the shores of several islands. These are mangroves, which can live in salt water. Some varieties have roots that filter out the salt; others absorb sea water and excrete the salt through their leaves.

On loose, sandy slopes, low-growing, mat-like plants of the spurge and borage families have spread out and stabilize the soil. Lichens cover the rocks near the shore, some yellow or orange crusts, some gray and branched. These primitive plants form a network of fungus around algal cells that use sunlight to make food. Extremely hardy, they thrive with just a bit of moisture from the ocean spray. Covering the ground in many coastal areas is a succulent plant (Sesuvium) that turns red in November. This equatorial "autumn" display really stands out, as red is a somewhat rare color among the other native flowers.

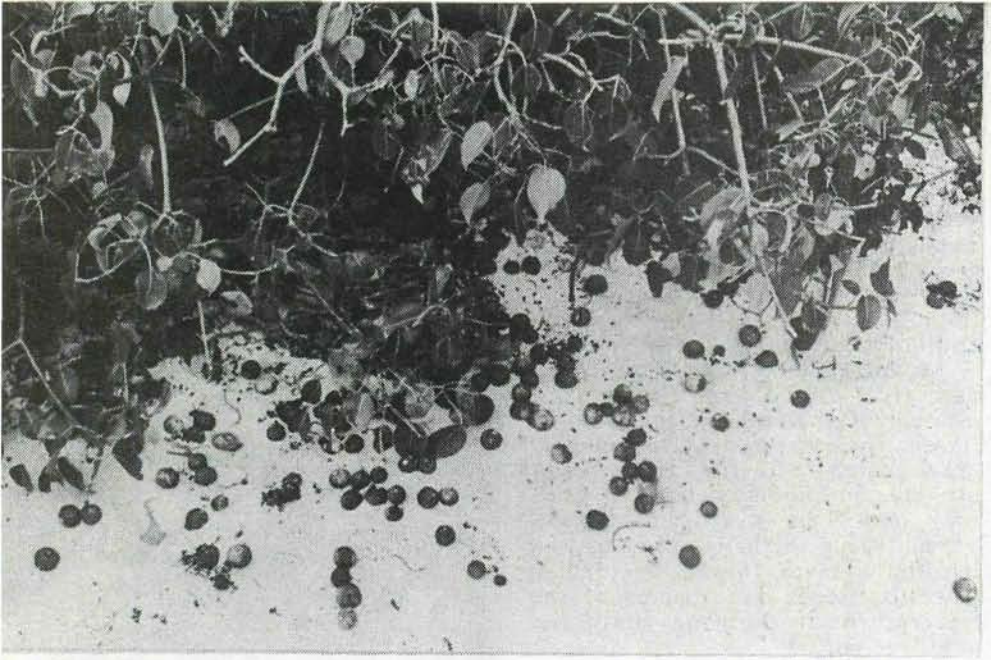
Many trails wind through the Dry Zone, home to the Galapagos tree cacti. There are a few candelabra-like cacti, resembling those of the western United States. Most common is a prickly pear cactus (Opuntia) with flat, spiny pads. As it grows to tree height, spines drop from the main stem and are replaced by reddish-brown bark. To survive the dry environment, these cacti have done away with leaves which lose water to the atmosphere. They manufacture food in their green pads. They can also store water in spongy tissues and so provide thirst-quenching food for tortoises and land iguanas.

A bit further inland, the dominant tree is *palo santo* (Bursera), a member of the frankincense family. It's easily recognized by the silvery-gray color of its trunk and branches. For most of the year, *palo santo* lives in a dormant state. Then, during the brief rainy season, it sprouts leaves, flowers and fruits. Once its seeds are dispersed, the tree returns to dormancy until the next wet period.

Some unique shrubs live in the dry forest, such as the Galapagos tomato (Lycopersicon) with its small, yellow fruits relished by tortoises. In fact, the seeds of this tomato can only germinate after passing through a tortoise! Recently, this species has been crossed with domesticated tomatoes to transfer its tolerance of salty conditions. The resulting hybrids will produce bigger fruit and grow in



ABOVE: Galápagos cotton shrubs have showy yellow flowers with red centers. BELOW: A land iguana dines on a prickly pear pad. They prefer cactus flowers or fruit when available but readily eat the spiny fruit.



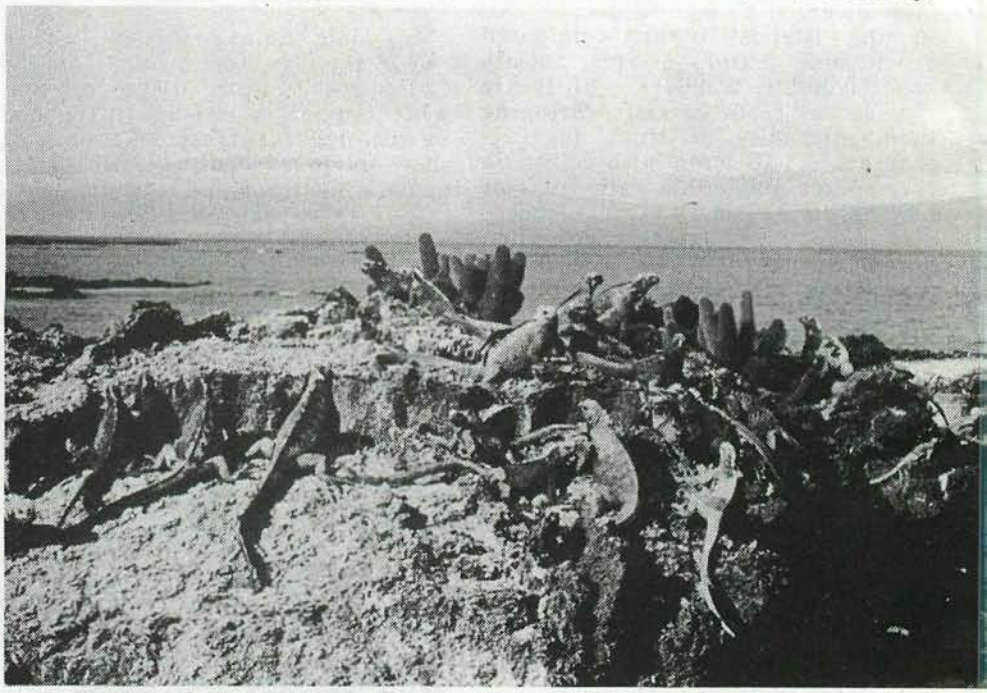
LEFT: The fruit of the only native poisonous plant (Hippomane) is not eaten by reptiles or birds. BELOW: Marine iguanas bask in the sun to raise their body temperature after diving for seaweed. Some small cacti grow on the otherwise bare lava outcrops. FAR BELOW: Palo Santo trees survive the dry season in a dormant condition. Note trees invading fresh lava flow in background.

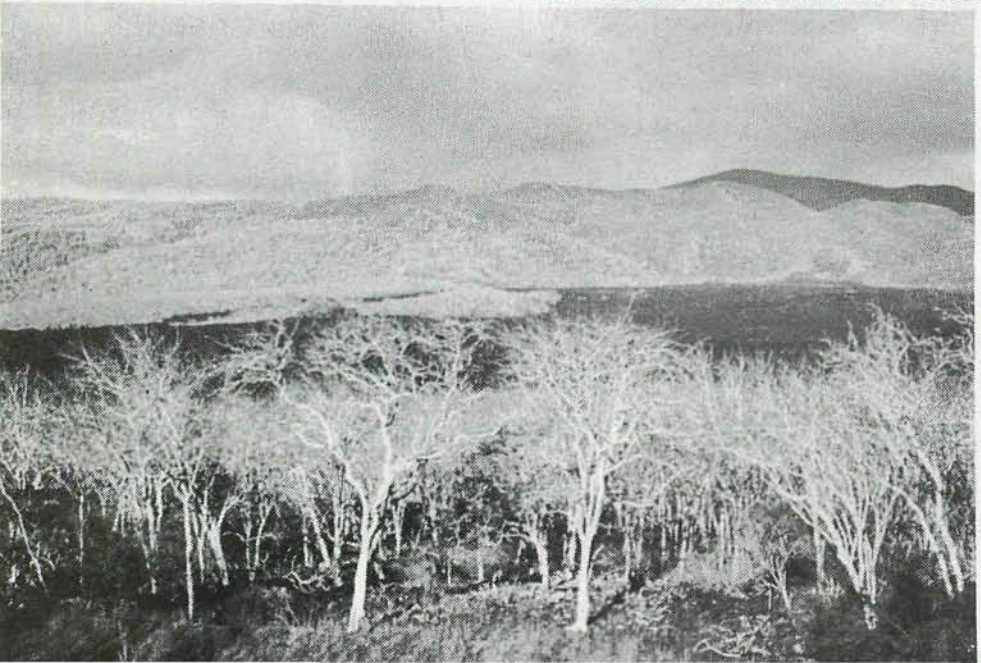
soil too salty for most cultivated varieties.

Galapagos cotton (Gossypium), a larger shrub with conspicuous yellow flowers, is related to South American species. Birds gather the soft fibers for nests.

Above the dry zone is a very different world seldom visited. Here one sees remnants of a once extensive forest of trees (Scalesia) belonging to the sunflower family. These elm-like trees have straight trunks and arching branches; the flowers resemble small, white zinnias. Passionflower vines wind around the trunks, and bromeliads, orchids and mosses festoon the branches. This is certainly the most unusual Galapagos habitat, and it is unfortunate that it has been damaged by humans. The richer soil and lush vegetation of these higher elevations have attracted farmers and ranchers who cut down forest for crops and graze cattle on the native plants.

Beyond the forest is another zone that has been even more restricted by grazing. Here one finds the shrub Miconia. This attractive plant puts out many, tiny magenta flowers rising on branched stalks above its large leaves. The herbs and ferns that dot the wet forest are here and even more abundantly.





They form a natural grassland at the top of some islands.

Scattered among the grasses, sedges and small ferns are Galapagos tree ferns (Cyathea). Short in comparison with other tree ferns, these have the typical, upright trunk and cluster of arching fronds at the top. The most remote areas of the islands have their share of plants that have evolved into unique species.

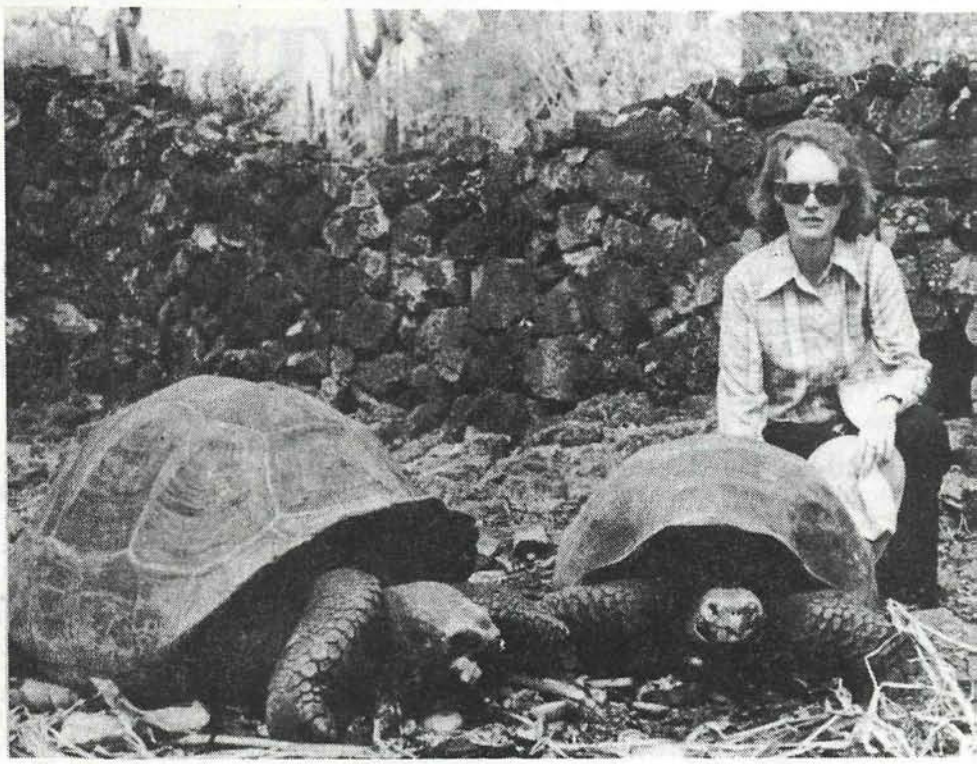
Residents of the Galapagos (recently numbering about 4,000) have introduced over 150 plants. Those that remain in gardens cause no problems. But others have spread into the native vegetation. There are the remains of avocado and guava groves, balsa and quinine trees, the get-rich-quick dreams of growers long gone. The economics of transporting any crop from the islands forced many settlers to

LEFT: Ferns and mosses cover the trees of the wet forest zone found at higher elevations. BELOW: The author with two giant Galápagos tortoises at the Charles Darwin Research Station. These reptiles feed exclusively on plants and live as long as 200 years. FAR BELOW: Vegetation near the shore includes succulents, lichens and young tree cacti.

leave.

The Charles Darwin Research Station is dealing with the conservation problems caused by newly introduced plant species. Their programs represent the efforts of scientists concerned with preserving Galapagos plants and animals for future study. Ecuadorians have become involved, and the islands' uninhabited land is now a National Park. Considerable progress has been achieved in preserving the remaining tortoises and eliminating the goats which, thriving in large numbers on several islands, destroy vegetation. Newly introduced plant species are being controlled.

This conservation program has worked well with increasing tourism. Trails are marked on the larger islands, and visitors are accompanied by an informative National Park guide. The trails are laid out for easy viewing of animals, birds and plants. Visitors can roam the beaches and observe sea life from the ships. Those with a special interest in plants can arrange to drive to the top of one island and see all the zones described here.



Truly, the Galapagos Islands are a paradise for nature lovers. There are beautiful beaches, striking volcanic scenery and fascinating animals and birds. Surrounding the unique wildlife and essential to its survival is a complex association of plants. While some are familiar to travelers, others cannot be seen anywhere else in the world. All have journeyed across the ocean and have adapted to their new and unusual environment. They deserve to be noticed and appreciated. ▮

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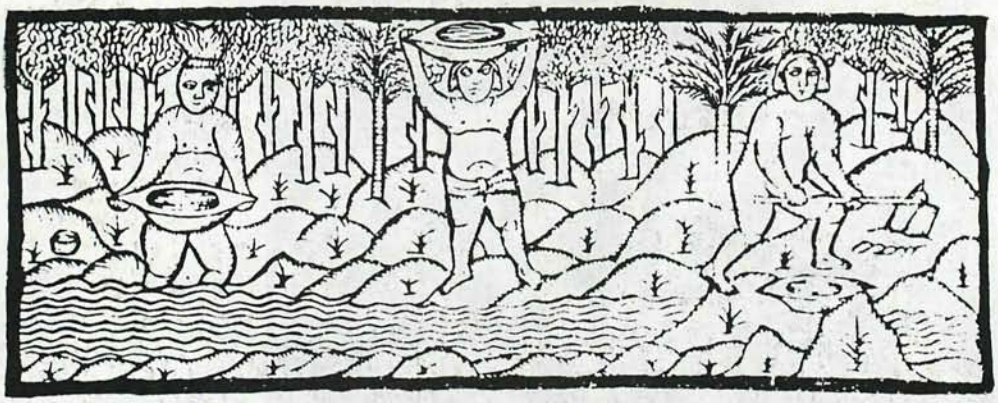


The Goldfields of Tipuani

By Stewart Redwood
PHOTOS BY AUTHOR

The 19th century gold rushes to California, Australia and the Yukon are the stuff of legends, but few people realize that an old fashioned gold rush is taking place today in the vast, steamy jungles of the Amazon Basin. Prospectors by the thousands are flocking to the Amazon basin of Brazil, and the upper Amazon basins and Andean foothills of Bolivia, Peru, Ecuador, Colombia and Venezuela.

A dramatic increase in the price of gold in the late 1970's set off the Amazon gold rush, together with a drive to open up the interior. Similar to gold rushes of the last century, vast numbers of individual prospectors are involved, although the mining companies are also important. In Brazil alone, estimates put the number of prospectors at nearly half a million.[1] Most miners simply struggle to survive in the desperate economic climate,[1] but a lucky few make their fortune, such as Julio de Deus Filho. Julio found the second biggest gold nugget ever -- the 137 lb (51.1kg) "Canaan" nugget -- at Serra Pelada in Paraa, Brazil, in 1983. He sold it for one million U.S. dollars.[2]

Yet recent gold mining in the Amazon is only the latest chapter in a long history going back several hundred, if not thousands of years. Successive civilizations have each revived gold mining and left their mark. One of the most voracious episodes was the Spanish and Portugese colonial period, during which Brazil, between 1700 to 1850, became the world's premier gold producer.[1,3,4].

In September 1984 I was in Bolivia doing geological fieldwork in the Andes for my Ph.D. when I determined to visit the gold field at Tipuani in northern Bolivia. This article describes my visit to Tipuana.

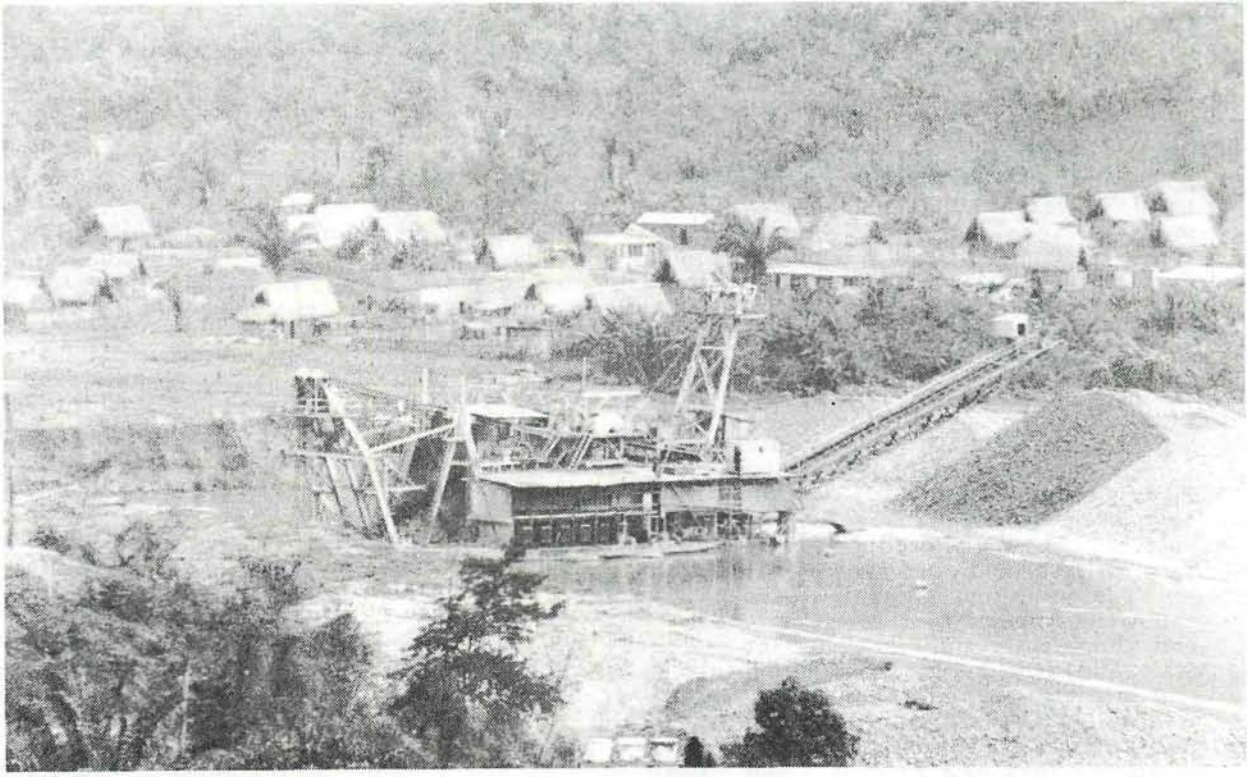
Location and Access

The Tipuani goldfields are in the Andean foothills of the Eastern Cordillera of northern Bolivia, in the Province of La Paz and north of the city of La Paz. Most of the rivers which drain the Cordilleras Real, Apolobamba and Carabaya of the Eastern Cordillera in northern Bolivia and southern Peru are gold bearing, but those on the east side which form the head waters of the Amazon are much richer, and of these, the Tipuani river has long been regarded as the richest.

The best way to get to Tipuani is by the new Yungas road from La Paz which follows the Unduavi Valley and the Coroico Valley past Coroico and through Caranavi to Guanay. This broad, new metalled road climbs out of La Paz and crosses a pass of 4,630m (15,200ft) between the towering, snow covered peaks of the Cordillera, and through some equally imposing road cuttings. It soon peters out, however, to a narrow, steep, muddy track. This winds its way tortuously down into the deep, thickly wooded Unduavi valley, then over another high ridge into the Coroico valley. In many places the road has been hacked out of the overhanging cliffs. There are no reassuring crash barriers; only crosses line the edge of the road, commemorating the end of the line for cars, trucks and packed buses which careened over the edge. But the scenery more than compensates for the state of the road.

By Coroico, the valley levels out and you can give your nerves a rest as the road follows the river through the deep, more open valley and some spectacular gorges. The climate by now is subtropical, the valley covered in dense jungle with terraced fields and plantations of banana, coffee, sugar, cane, oranges, papaya, and mangoes. Over the road, clusters of weaver bird nests hang from the trees like huge rain drops. Eagles and condors soar high above. At night the trees are full of fireflies, and the valley looks like a flickering, starry sky.

Guanay is the centre of the gold mining district and lies at the confluence of the four rivers which drain almost the whole of the Cordillera Real: the Mapiri, Tipuani, Challana, and Coroico/Zongo. Together these form the Guanay or Kaka (Caca) which joins the Alto Beni to continue as the Beni on to the Brazilian frontier, where it joins the Mamore to form the Madeira, the largest tributary of the Amazon. Guanay lies in a tropical climate at an altitude of about 400m, yet is only 90km from the 7,014m (23,000ft) peak of Illampu, showing how steep the topography is. The



RIGHT: The gold dredge which has been working the river gravels since 1960, seen here opposite Guanay in 1984. BELOW: Cangalli ferry takes vehicles across the Tipuani River. OPPOSITE: Indian gold panners of the early 16th century with bateas, or gold pans, they still use today.

road from La Paz to Guanay takes about nine hours in a jeep, nearly double that by bus and at least two days by truck. Alternatively, you can fly form La Paz to Tipuani, Teoponte or Mapiri in only half an hour!

The Coroico road was only completed a few years ago (1980?). The traditional route to Tipuani is by the old foot and mule trails from Sorata, 80km NW of La Paz. Sorata is a pleasant town, lying in a subtropical valley under the shadow of Illampu. It was once the rich Spanish centre of the gold mining districts. The northerly trail is a three-day trek to Mapiri followed by a day's canoe voyage downriver to Guanay. It was used and described by Fawcett in 1906,[5] and by Corning (1886)[6] and Woodbridge (1927)[7]. The southerly trail is a week-long trek down the Tipuani valley, and the route is described by Pilkington.[8] Both trails are Incan, with good examples of Inca paving, steps and tunnelling. When I was at Tipuani in 1984, it was well under construction.

The Geology

The Eastern Cordillera and foothills (Subandean Zone) are made of a thick, monotonous sequence of Cambrian to Devonian (590 to 360 million years old) marine shales and sandstones. These sediments were strongly folded 350 to 330 million years ago during the "Early Hercynian" orogeny, and granite plutons were intruded at the same time to form the Zongo-Yani pluton in the Cordillera Real, and others in the Cordillera de Carabaya. Gold rich fluids related to the plutons crystallized in fractures in the surrounding sediments to form gold-quartz veins. The veins and granites were emplaced while the sediments were being folded, and so they, too, are deformed. These contrast with the granites which form the other peaks of the Cordillera. These are much younger (225 to 202, and 25 to 19 million years old) and undeformed. They have tin-tungsten veins associated with them, with small amounts of gold and other metals.[9,10,11,12]

The gold-quartz veins have been mined on a small scale around Yani and in the Cordilleras de Apolobamba and Carabaya. However, erosion of the gold from these veins by glaciers and rivers has formed much richer and much more extensive placer gold deposits. Placer gold has been mined in all of the rivers on the east side of the Cordilleras Real, Apolobamba and Carabaya, and in several on the west side of the Cordilleras.

In the Tipuani area, gold occurs in several different types of placer deposit. The oldest are the old river channels filled with cemented gravels (conglomerates) and called *cangalli* deposits (after a village just downstream from Tipuani). These valleys are up to 2.5km-wide and bear no relation to the present valleys -- they traverse hills on either side of the present river and are much steeper.[13] They were formed by intense erosion following the first major recent uplift of the Cordillera and are probably Miocene (25 to 5 million

years ago) in age. Widespread gravels washed down from the glaciers during the Pleistocene glacial period (2 million years ago to 10,000 years ago) then blanketed much of the area. The present valley system started to develop during the last glaciation, and placer gold occurs in alluvial deposits in the terraces, benches and beaches (*playas*), flood plains and beds of the present rivers.[6,9,13] The falder deposits in the valley sides appear to have been eroded from in situ vein sources.[6] All of these different types of deposits have been worked at one time or another. The main producers have been the river beds and *playas*.

The gold from Tipuani is deep yellow in colour. It is remarkably and consistently pure at 980 fine (98% gold; fineness is the gold content in parts per thousand. The rest is usually silver or copper. Gold purity is also quoted as parts per 24 carats, so that 98% gold is about 23.5 carats). The gold occurs as flat, oatmeal shaped scales, and in fine grains and dust. Nuggets and wire gold are rare.[6] Occasional grains of platinum were also reported by Corning,[6] but not by anybody else.

The History

Gold has been won for countless centuries in the valleys of the Cordilleras Real, Apolobamba and Carabaya. Evidence of gold, copper and silver use dates back over 3,000 years in the Central Andes.

The Aymara kingdoms (13th to 15th century AD), the earliest important gold producers that we know of, maintained gold and silver mining colonies in the Carabaya and other eastern valleys.[14] Gold, we know, was sacred to the Incas (1460s to 1533). They believed it emanated from their Sun god. The Incas were prolific gold miners, employing thousands of Indians in the Tipuani and neighbouring valleys. Gold ornaments, copper relics, hardwood picks and stone hatchets have been found in the alluvial deposits at Tipuani.[6] The gold was sent to Cuzco where nearly all of it fell into the insatiable hands of the Spanish in 1533 to pay the legendary ransom of Atahualpa.

However, the Incas evidently concealed their gold source from the conquistadores, for it was not until 1562 that the Spaniards began to suspect the existence of gold at Tipuani, and they started mining there in 1566.[15] There were two Spanish expeditions to Charcas (Upper Peru), the area which is now Bolivia, in 1535 and 1538. The town of Chuquisaca (now Sucre) was established on the second expedition, but Charcas received little attention until the discovery of silver at Potosi in 1545. Soon thereafter, the city of Nuestra Senora de La Paz was founded in 1548 at a strategic location on Chuquisaca-Potosi-Cuzco road.[14]

La Paz felt the effects of gold discovered in valleys in and around the city and the rivers Palca, La Paz, Choqueyapa (Kaluyo -- "farm or estate of gold"), and Chuquiaguillo ("little river of gold"). Father Barba in 1637[16] wrote that:

Many mine workings exist there, dating from the time of the Incas. It is a land well known to be fertile in Gold; and during the rainy season boys find Nuggets in the Streets, especially in the one which descends by the Monastery of the Dominicans towards the river.

MacLaren (1908)[17] also said that much coarse gold and nuggets had come from the Chuquiaguillo placers. The largest nugget weighed 703oz (21.9kg) and was sent to the king in Madrid in 1718. Others weighing 162oz (5kg) and 133oz (4.1kg) had been found in recent years. Forbes (1861)[18] gave a good description of the gold workings in the Chuquiaguillo valley:

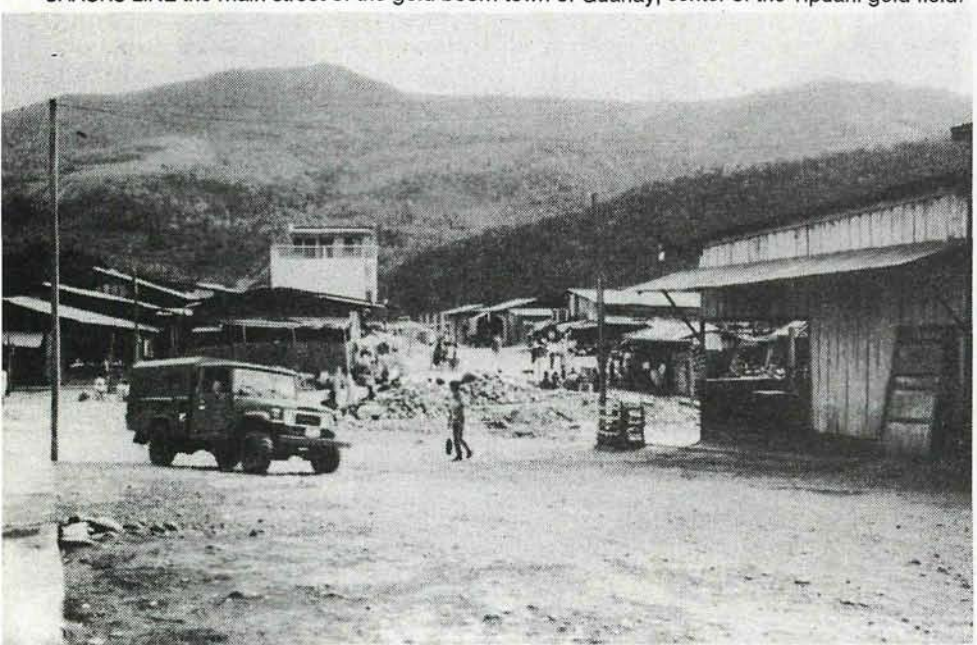
The rabbit-like burrows made by the Indian gold-workers into the more auriferous beds are everywhere visible along the sides of those valleys...and frequently later explorations have disclosed the mummies or skeletons of unfortunate Indians who have perished in these narrow and tortuous holes, from the falling in of the superincumbent earth, and have been buried along with their mining implements.

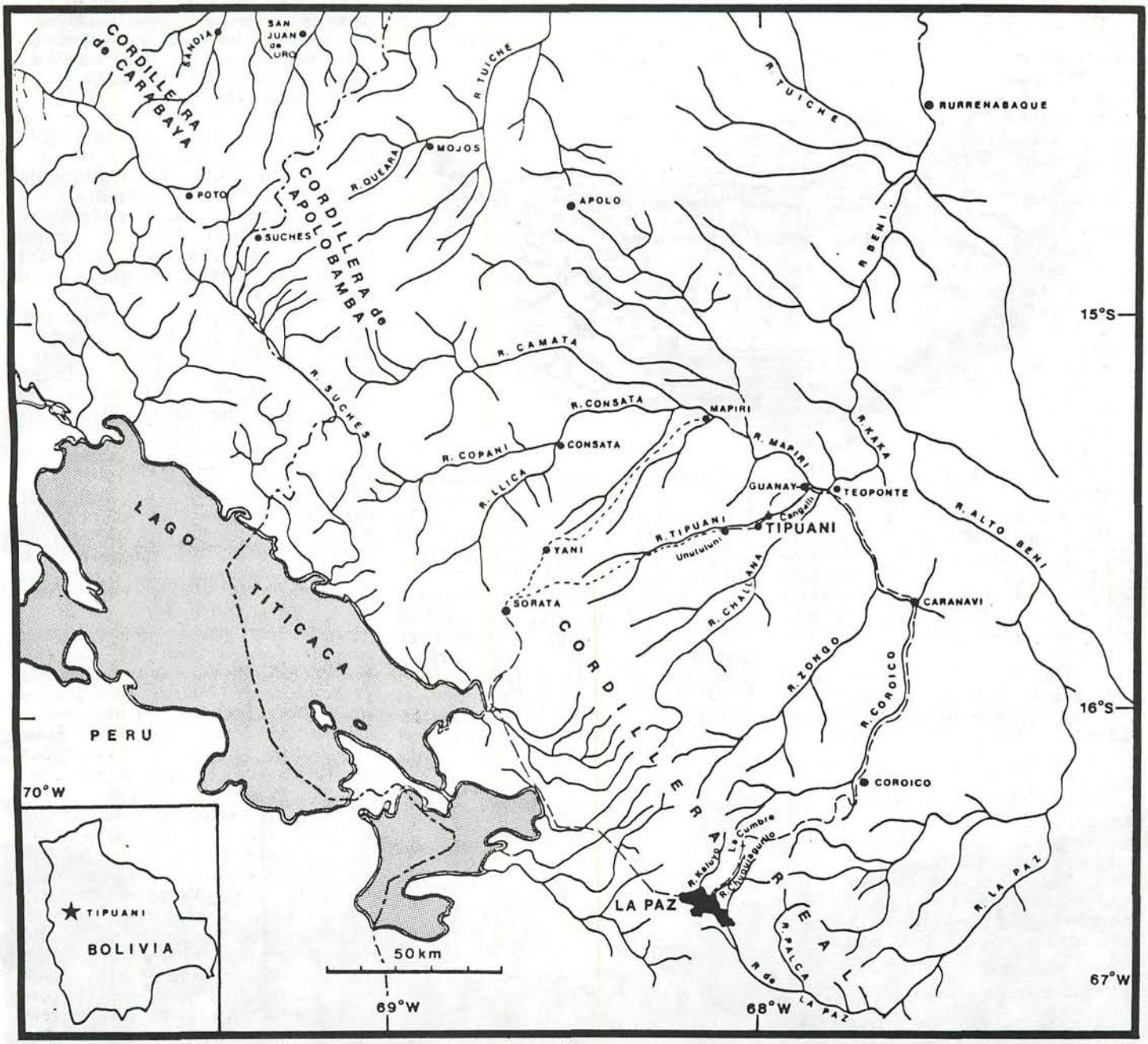
Similar finds have been made at Tipuani, and such dangerous mining practices exist today. The Spaniards mined the valley-side deposits extensively. Their main technique, besides shallow mines and panning, was the *cochea*, a form of booming or gouging using sudden floods of water rather than a continuous flow. An excavation was progressively widened by loosening its sides and periodically washing the soil away with a torrent of water released from a small dam, leaving only the gold and boulders behind. Once a large area had been excavated in this way, the remaining gold on the floor was cleaned up in pans and sluices -- a laborious, wasteful process, with more gold carried away by the torrent than was left behind. Today remains of stone pits, basins, reservoirs, aqueducts, sluices, excavations and boulder-dumps from these workings lie overgrown on the valley sides.[6,18]

Spanish mining of the Tipuani placers started in 1566. One of the most productive areas in the early days was "Roman Playa," about 20km upstream from Tipuani. It is claimed that over US$30 million worth of gold was washed from an area of five hectars here. Numerous relics of Inca and Spanish mining have been found, including silver Spanish coins of the reign of Carlos V (1517-1558).[7] Mining advanced with the introduction of iron tools and gunpowder in 1571.

A flourishing Spanish gold

SHACKS LINE the main street of the gold boom town of Guanay, center of the Tipuani gold field.





rush started in 1602, making large fortunes for the Spaniards of La Paz and Sorata for nearly two centuries. A system of conscripted Indians, the *mita*, provided labor, and black African slaves brought from Brazil worked with the *mitayos* from 1620. It is recorded that work stopped for some time in 1760 because of disagreements between members of the society of mineowners, but new immigrants -- the Rodriguez -- successfully revived mining operations.[15]

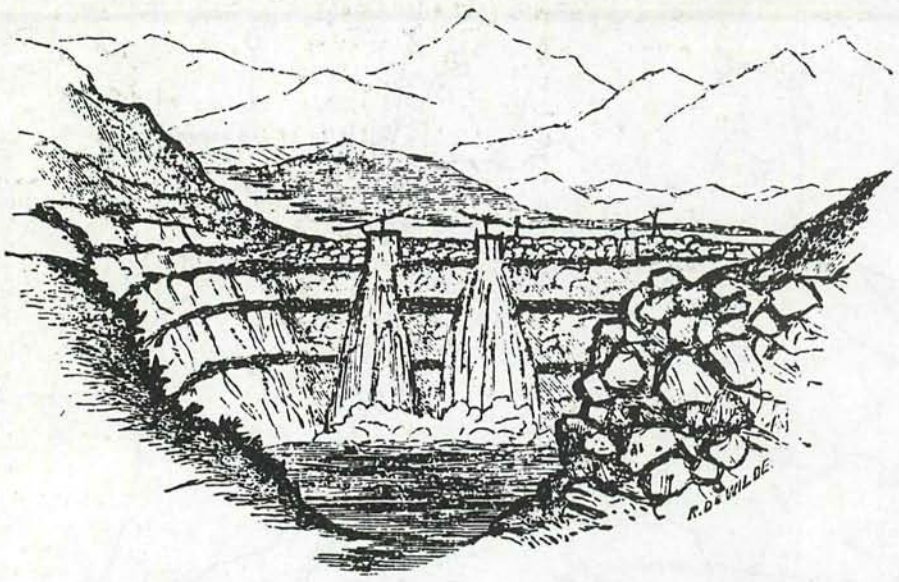
This Spanish gold rush and the prosperity it brought ended suddenly with the Tupac Amaru rebellion of 1780-82. This was a well organized Indian uprising against Spanish rule and spread throughout the highlands from Cuzco to northern Argentina.

In March 1781, the nephew of Tupac Amaru, Andres Amaru, conquered the entire province of Larecaja along the eastern shore of Lake Titicaca (which includes Tipuani). After a three-month siege, he took the provincial capital of Sorata in August 1781, burning, looting and killing Spaniards. Andres and Tupac Catari then laid siege to the city of La Paz until late in the year royalist troops from Buenos Aires and Lima, led by Sebastien de Segurola, broke the siege. The Spanish regained control in La Paz and Sorata, put the Indians to flight and captured the leaders. The Indians are said to have dumped most of the booty in Lake Chimbaro. None of it has ever been recovered. Interestingly, I have never been able to find this lake on any map.[14,15]

Many Colonial gold mines were hidden and the trails leading to them destroyed by the Indians during the uprising, particularly in the Cordilleras de Apolobamba and Carabaya. They remain lost to this day.[19]

Gold workings at Tipuani soon revived, however, and several new deposits found. Still, Indian labour, continued to be a problem, and black slaves had to be brought in again.[15]

The first quarter of the 19th century was a troubled time for Upper Peru. Wars of Independence culminated in the liberation of this region from Spanish rule and *the*



LEFT: Spanish mining method called cochea, illustrated here on the Río Chuquianguillo by Forbes (1861). Water was released from a small dam to loosen the black auriferous layers. BELOW: Guanay at the confluence of the Tipuani and Mapiri Rivers.

creation of the Republic of Bolivia in 1825.

An attempt at large scale mining was made at Tipuani in 1826 by a London company. Evidently no one visited the site since equipment ill suited to the terrain was sent out. By the time the mistake was realised, the company had gone bust.

One of the most successful and famous Tipuani miners in the 19th century was Ildefonse Villamil Blanco. Acquiring prospects in 1842, he began large scale mining in 1847 after a spell in political exile. He mined with great success for 20 years, dying in 1869 in Sorata. He is said to have mined over US$2 million worth of gold.[6,15]

Gold produced at Tipuani between 1818 and 1867 amounted to 150,776oz (4,689.7kg)[15], worth over US$50 million at today's prices. Gold production from 1545 to 1875 is estimated at 41 million pounds sterling at contemporary prices. This, however, only equals the first six years of the California gold rush.[6,15]

With Villamil's death, gold production declined rapidly. It almost ceased in the latter part of the 19th century, despite a venture by a German company. It failed for reasons similar to the British attempt of 1826.[15]

Average gold production between 1895 to 1899 dropped to 505kg per year, worth around 65,000 pounds sterling. Between 1903 to 1905, it sank even lower to some 4,500 pounds sterling per year.[17]

William Agle visited the goldfields in 1893. He published an interesting account[20] describing the neglected state of the workings, the mining techniques and the people working there, and suggested an ambitious scheme to mine the placers:

When I visited Tipuani in August 1893, I found there only nine men of foreign birth. Of these, the two McKenzie Bros. were at Ancota, perhaps one-half mile above the old town of Tipuani, and on the opposite side of the river. They had a hy-

RIGHT: Bolivians panning for gold with the traditional batea. BELOW: Washing plant. Gravel is dumped into a hopper on left and washed through a vibrating screen in the middle. (Photo: Phillippa Uwins)

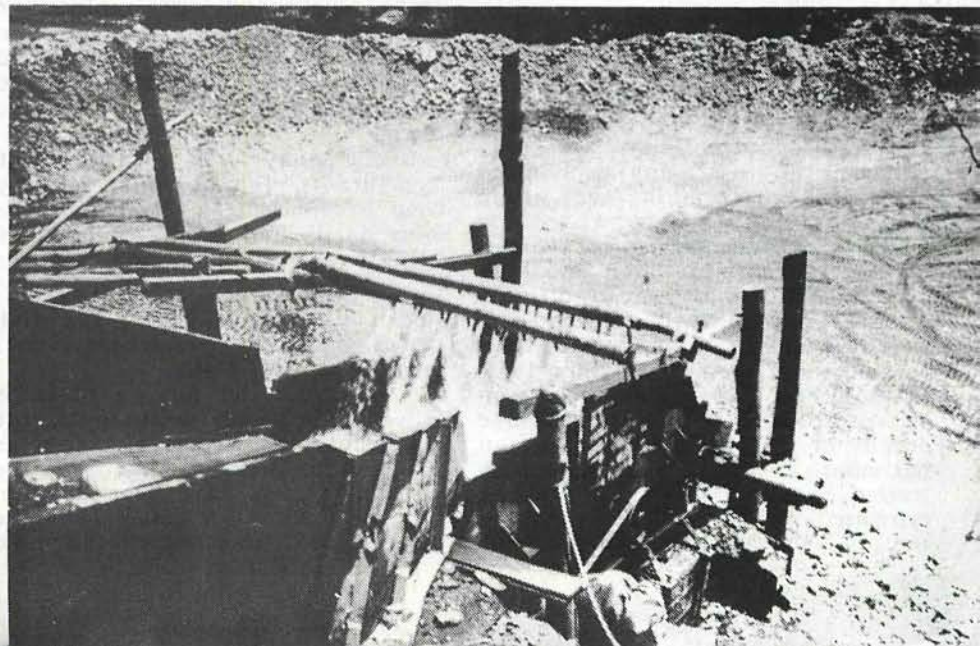
draulic claim which contained a pay streak of gravel 3ft in thickness that gave the extraordinary returns of $40 per cubic yard; but on the top of the pay streak lay a bank of sediment 36ft in depth which brought the average down to $3 per cubic yard. They had at that time cleaned up their flume the second time for the season, and each time with the same result, about 25lbs of gold. None of the other foreigners were succeeding with their work from different causes, chiefly inexperience and that lack of unity which seems to characterize all the foreign residents in South American countries. Two Germans, Fryerheysen, a Freiburg graduate, and Wezman, who had been sent out by a German syndicate, lacked practical experience. Messrs. Simpson and Skeffington, both experienced miners, were wihtout capital, and had been disappointed by their backer, a German merchant of La Paz.

Of Indians there were a few, with some negroes, descendants of some slaves whom the Portugese brought to the river 200 years before. They were working in the most primitive way; the men worked in the tunnels and their wives brought the dirt out in their bateas, *or wooden gold pans and washed it in the same, or else they went into the river at different riffles and, after turning over a large boulder, would kneel as low as possible in the water, scrape the sediment which had collected beneath the boulder into their pans or* bateas, *bring it ashore and wash it. They all had their sardine cans, which contained their gold, lying on the banks, and they took no notice, not even of a stranger, when he picked them up and examined their contents."*

Woodbridge (1927)[7] described a scheme by a North American company which had been underway since 1915 to start large scale hydraulic mining of the placers (using high pressure hoses to loosen and wash the gravel). This involved piping and channelling water from the Cordillera to ensure a continuous, year round supply. The scheme appeared to be paying off, but there is no subsequent mention of it.

The biggest systematic evaluation of and mining of gold in the Tipuani area was made by the Compagnie Aramayo de Mines in Bolivia in the late 19th and first half of the 20th centuries (the other two being the Patino and Hoschild groups). Aramayo owned the placers of the Tipuani, Challana and Kaka rivers from 1935 until 1952. It established reserves of 9.5Mm^3 (million cubic metres) of gravel in the river flats below Guanay, with an average gold grade (content) of 0.87g/m^3. Plans for dredging were shelved because of World War II and subsequent unfavorable conditions. It did, however, work the cangalli Miocene river channel conglomerates in Minas Tujujahuira and Liritani, between Tipuani and Unutulumi on the Tipuani River, in shallow underground mines, from 1942 to 1950. Aramayo recovered a total of 2,800kg of gold at the rate of about US$1 million per kilometer of channel mined, but the operation was unprofitable. The company was nationalized following the 1952 revolution in Bolivia. The Unutuluni cangalli mine was worked profitably by cooperatives for a few years after 1952, but all the cangalli mines were abandoned by 1964.[9,13]

Aramayo's evaluation of the Rio Kaka was, however, acted upon after the revolution by South American Placers Inc. under a special contract with the State. Since 1960 they have operated a floating dredge with a capacity of 200,000yd^3 per month on the alluvial deposits between Teoponte and Guanay. By the end of 1962 they had produced 3451kg of fine gold, and had reserves of 35Myd^3 grading $0.469 per cubic yard.[9] This dredge is still in operation and was clanking and clattering away opposite Guanay when I visited the area in 1984. Its slow trail could be seen by following the heaps of processed gravel lining the river banks downstream. South American Placer's concessions and dredge were bought from the Grace interests by the private Bolivian Compania Minera del Sur (COMSUR) in 1980. In mid-1982 the dredge was producing 700 to 800oz (22-25kg) per month.[21] The Bolinca Mining Corporation also had a concession for mining the Kaka in the Yaicura-Sipuati area, 25km downstream of Guanay, which they had previously worked in 1925. This was not yet in operation in 1964. Reserves at Yaicura



WASTE FROM washing plants is dumped on the river banks. Such plants extract around a quarter million dollars of gold a month.

are estimated at 38Myd^3 at $0.42 per cubic yard.[19]

Extensive prospection and evaluation projects for placer gold and other minerals have been undertaken during the last decade by state organizations, as well as international mining companies along the many rivers of the Andean foothills and the Beni Basin in northern Bolivia. The only known results so far is a pilot gold plant on the Madera River on the Brazilian border run by the state mining company COMIBOL.[21] One of the evaluation studies is the Apolo Project on the Tuiche River conducted by GEOBOL (the state geological survey) with support from the West German Goverment.

Gold Rush Today

Most of the placer concessions in the Tipuani area are owned by South American Placers, but individual miners are legally permitted to work concessions above Teoponte. They are only allowed to use non-mechanised methods, but in practice, they group themselves into cooperatives to purchase trucks, excavators, bulldozers, pumps and washing plants, in addition to the traditional wooden pan (*batea*), sluice and shallow mines.[22] Cooperatives have worked the Tipuani area since 1956. In 1962 there were 1,200 workers on 42 prospects, with an average output of 89g of gold per person per month.[19] The present gold rush started in the 1970s. In 1981 an estimated 6,000 miners worked there. Credit extended by the World Bank to the Banco Minero to buy a plant doubled the capacity of the washing plants in 1981. Methods are highly inefficient, however, and gold recovery stands at only 30%.[23] The Banco Minero reported gold production in 1982 at 40,145oz (1,249kg), but the Ministry of Mining & Metallurgy gave a more realistic estimate of 321,500oz (10,000kg). The discrepancy lies in the huge amount of gold smuggled out of the country.

We arrived in Guanay after dark on a Saturday night in September 1984, surprised to find the town so lively. Typically, everyone in mountain towns goes to bed at dusk. It is well nigh impossible to find a hotel or restaurant after dark in cities such as Potosi or Sucre. Guanay is a small, boom town out of an old cowboy movie. Jeeps, trucks and buses replace the horses on its twisting, bumpy main street which traverses a regular grid of neatly painted adobe houses. Board and tin shacks surround the town.

Guanay is full of "restaurants," few of which sell any food except beer. All feature the most lurid and gaudy murals of voluptuous nudes posing against scenes of local gold mining! Stinking drunk patrons, paying sky high prices, pack the bars where racous music blares all night.

Across the way, a plaza is filled with people sleeping on the pavement -- new arrivals with, as yet, no money. Most of the unpaved streets have been dug up, the dirt panned for gold left in the river terrace upon which the town is built!

For some mysterious reason, the electricity went off regularly every quarter of an hour.

The drive from Guanay to Tipuani is spectacular. The dusty, orange trail climbs steeply up a ridge southwest of Guanay. The drive along the top presents magnificent views of hazy, blue mountains and jungle -- the snowy, cloud covered peaks of the Cordillera Real in the distance. A latter-day robber baron inhabits a small village near the top. He has tied a rope across the road and charges a toll to pass through!

Beyond over another ridge, the road descends to the Rio Tipuani at Cangalli. A small ferry consisting of three canoes abreast with a deck and powered by an outboard motor takes vehicles across the river to Tipuani for an exorbitant fee -- the equivalent of over US$1 (B$14,300 then). There is a suspension footbridge here, and a road bridge was being built.

From here the road climbs the steep, narrow street that is Cangalli, onto a river terrace with a large grassy plaza and football field. Between Cangalli and Unutuluni the valley broadens out. Below lies the flat Tipuani Valley with the meandering river and gold diggings everywhere. The village of Tipuani lies on the south side of the valley.

The inhabitants of Tipuani are all young Bolivians. I was suprised not to see any gringo adventurers. My driver, Lucio, was amazed to see so many new vehicles. He told me of a friend

who came here to work as a mechanic. He had already made enough money to buy three new jeeps and a three-story house in La Paz.

Along the fast, muddy river men washed gravel in pans or sluices, while others bathed in the river and women washed clothes. Trucks and bulldozers, being washed, gleamed in the river.

Most of the gold is worked by cooperatives. I counted at least 30, and there are probably more. A typical Cooperative has about 50 members and works a 120ha concession. They process 400 to 500m^3 of gravel a day with grades from 0.35 to 0.8 g/m^3, and produce 16 to 20kg of gold per month. That represents a montly total of over US$200,000!

Gravel excavated from the river bed, banks and terraces by diggers and bulldozers is loaded onto trucks. It goes to one of the large concrete washing plants seen everywhere along the river. Here the gravel is washed through a vibrating screen of c10cm to remove the boulders. As it passes through long wooden sluice boxes, the gold grains are trapped behind riffles and in blankets.

Today, as in times past, miners face age old problems. Until recently access to Tipuani was by foot or mule, making it difficult to bring in machinery. Even today the road is slow and dangerous. Air transport has greatly improved access for those who can afford it, but it is unreliable during the rainy season. Labour is, as always, a problem. Mining schemes in the past used conscripted Indian labour and black slaves. The large scale mining schemes of the 19th and 20th centuries made great efforts to attract and keep a workforce.

The present gold rush is rather different. It is characterized by large numbers of people working for themselves in cooperatives. From all over Bolivia, people are streaming in, driven by gold fever, unemployment and the desperate economic situation. My driver alone knew 20 to 30 people who had come to Tipuani from the mine where he usually worked near Oruro.

Another problem the miners face is the seasonal shift in water flow. The river is often so low during the dry season (April to October) that work must cease for several months. When the rain comes, on the other hand, it often causes serious flooding. Woodbridge[7], you will remember, tried to get round this problem by piping water from the Cordillera to insure a continuous, year round supply.

The Tipuani area is one of the richest gold placers in Bolivia. Despite such problems as these, successive civilizations and generations over the centuries have made fortunes here. In Bolivia's desperate economic situation just now, it provides wealth and prosperity for some, and a livelihood and hope for thousands more. ■

REFERENCES

I have listed all the references known to me about the Tipuani region; #24 to #31 have so far proved elusive and were not consulted in this study.

1. Schiller, E. A. (1985), "Gold in Brazil," Min. Mag., Lond., 153, 313-319.

2. Meyer, M. R., Margolis, M. , & Smith, M. (1983), "A Gold Rush in the Amazon," Newsweek, 102, 3/10/83, 48-9.

3. Russell-Wood, A. J. R. (1984), "Colonial Brazil: The Gold Cycle, c.1690-1750." In: The Cambridge History of Latin America, Vol. II, Colonial Latin America, (Ed.: L. Bethell), pp547-600, 868-76; Cambridge U. Press, Cambridge.

4. Green, T. (1985), The New World of Gold, Weidenfeld & Nicolson, London, 272p., pp91-97, Brazil: El Dorado in the Amazon.

5. Fawcett, P. H. (1953), Exploration Fawcett, Hutchinson, London, 312p., pp31-42.

6. Corning, F. G. (1886), "The Gold Deposits of the Tipuani River, Bolivia, S.A," Engng. Min. J., 42, pp58-60.

7. Woodbridge, D. E. (1927), "Rejuvenating a Bolivian Placer," Engng. Min. J., 124, pp87-90.

8. Pilkington, J. (1980), "The Golden Valley," In: Backpacking and Trekking in Peru and Bolivia (H. & G. Bradt), pp118-124; Bradt Enterprises, Bucks, England and Boston, MA, 1975, 3rd ed. 1980.

9. Ahlfeld, F. & Schneider-Scherbina, A. (1964), "Los yacimientos minerales y de hidrocarburos de Bolivia," Dep. Nac. de Geol. Boletin, No. 5, La Paz, Bolivia.

10. Ahlfeld, F. (1967), "Metallo-genic Epochs and Provinces of Bolivia," Miner Deposita., 2, pp291-311.

11. Bard, J. P., Botello, R., Martinez, C. & Subieta, T. (1974), "Relacions entre tectonique, mtamor-phisme et mise en place d'un granite eohercynien a deux micas dans la Cordillere Real de Bolivie (Massif de Zongo-Yani)," Cah. Orstom, Geol., 6, pp3-18.

12. Carlier, G., Grandin, G., Laubacher, G., Marocco, R. & Megard, F. (1982), "Present Knowledge of the Magmatic Evolution of the Eastern Cordillera of Peru," Earth Sci. Rev., 18, pp253-283.

13. Stoll, W. C. (1961), "Tertiary Channel Gold Deposits at Tipuani, Bolivia," Econ. Geol., 56, 1258-1264.

14. Klein, H. S. (1982), Bolivia: The Evolution of a Multi-Ethnic Society, Oxford Univ. Press, New York, Oxford, (Latin American Histories), 318p.

15. Frochot, M. (1901), "Note sur les Gisements de Tipuani (Bolivia)," Annls Mines Carbur., Paris, Ser. 9, Memoirs 19, pp149-185.

16. Barba, A. A. (1637), Arte de los Metales (Madrid, 1640), English trans. R. E. Douglass & E. P. Mathewson (John Wiley & Sons, Inc., New York, Chapman & Hall Ltd., London, 1923), p65.

17. MacLaren, J. M. (1908), "Gold: Its Geologiçal Occurence and Geographical Distribution," The Mining Journal, London, pp638-630.

18. Forbes, D. (1861), "On the Geology of Bolivia and southern Peru," Q. Jl. Geol. Soc. London,17, pp1-62, p20.

19. eg Fawcett, op. cit., pp159-161.

20. Agle, W. C. (1897), "The Tipuani Gold-Fields of Bolivia," Engng. Min. J., 63, p544.

21. Claure, H. (1984), "Prospección minera de los depósitos aluviales en el noreste boliviano," Resumenes de II Congreso Geológico de Bolivia, 10-15 Sept. 1984, Cochabamba, Bolivia, pp57-58.

22. Fox, D. J. (1983), "Bolivia," in: Mining Annual Review 1983, pp307-311, Mining Journal, London.

23. Fox, D. J. (1982), "Bolivia," in: Mining Annual Review 1982, pp348-351, Mining Journal, London.

24. Weddell, H. A. (1853), Voyage dans le Nord de la Bolivie et dans les parties voisines du Prou ou visite au district aurifere de Tipuani, Paris.

25. Ballivian, M. V. & Zarco, J. (1898), "El oro en Bolivia," Mono. de la Indust. Minera, I Oficina Nacion. de Immig., Estad. y Prop. Geog., La Paz, Bolivia, 248p.

26. Stines, N. C. (1940), "Dpositos auríferos de Bolivia," Boln. Soc. Ing., Lima, Año 19, No. 24, pp66-71.

27. Gerbrecht, F. (1944), "Los trabajos auríferos de la Cía Aramayo de Minas en la regíon de Tipuani," Minería Boliv., I (12).

28. Gouka, A. (1962), "Yacimientos aluviales en Bolivia," Minas y Petrol. de Bolivia, II, No. 5.

29. Freydanck, H. G. (1964), "Actividades de exploración en la zona aurífera norte de La Paz," Informe Dep. Nac. de Geol.,(GEOBOL), La Paz.

30. Freydanck, H. G. (1965), "Los placeres auríferos al pie de la Cordillera Oriental de La Paz," Informe Dep. Nac. de Geol., (GEOBOL), Tomo 1, La Paz.

31. Freydanck, H. G. (1966), "Los placeres auríferos al pie de la Cordillera Oriental de Bolivia," Informe Dep. Nac. de Geol., (GEOBOL), Tomo 2, La Paz.

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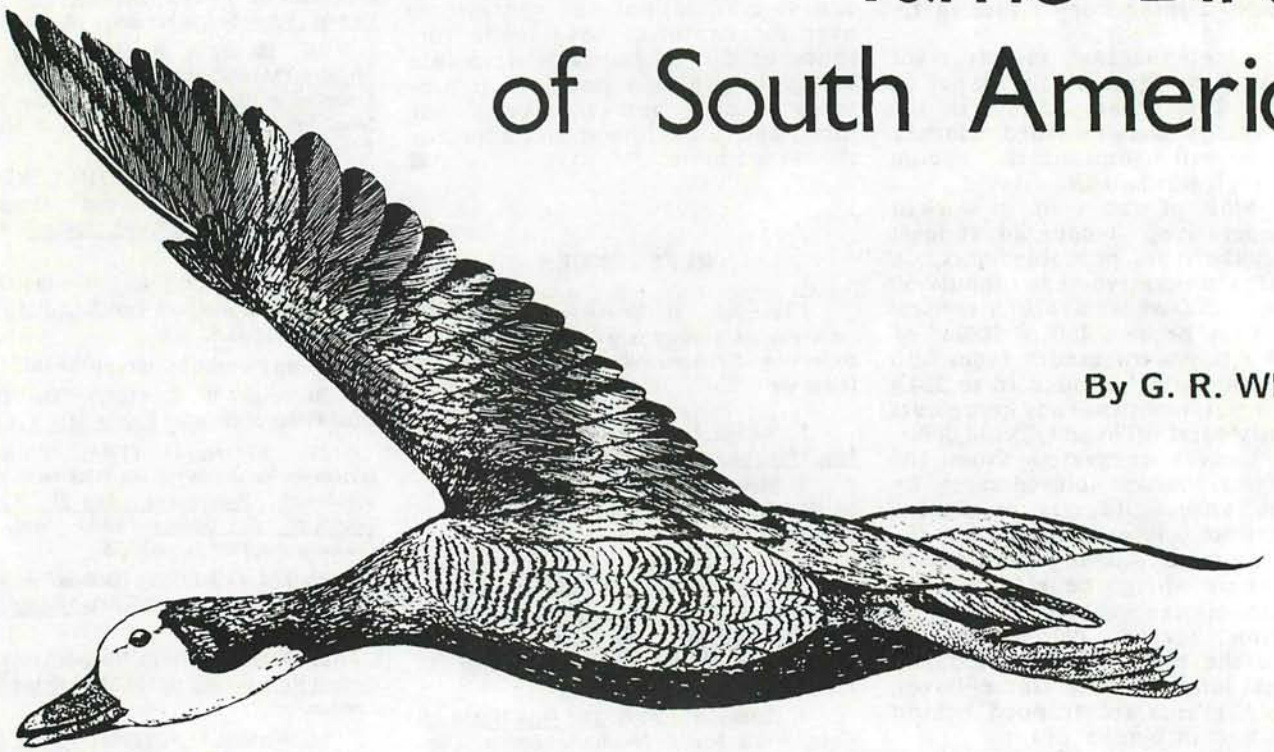
Tame Birds of South America



By G. R. Whitley

Whitefaced Tree Duck

To my fellow explorers, though we may never meet, I send affectionate greetings. Affectionate because I believe that those who enjoy exploration are united by their love of discovery.

Actually, my own little bailiwick is in the Sierra Madre Oriental south of Saltillo and Monterrey in northeast Mexico (not South America).

My pet subject is the domestication of animals, plants and especially birds -- birds you will probably encounter among the villages of South America (and perhaps even in the suburbs).

Throughout South America, caged songbirds and birds of brilliant or striking plumage are favorite items for sale in local open markets. There are, however, large game-birds which have been kept, tame and at liberty, by the Amerindians for thousands of years.

The free-roaming tame birds which I will discuss serve very practical functions for their human masters. From the most ancient times up to today, they have been kept as scavengers, snake-killers and to catch other birds. Some serve as loud-voiced sentinels, like the geese of ancient Rome which proclaimed the unseen nocturnal approach of barbarian hordes. Some are merely "meat on the hoof," awaiting an invitation to the pepper pot. All produce feathers for arrows, ritual decorations, prestigious display, or negotiable trade goods and currency.

Briefly, the main groups of useful tame birds are: the Curassows, the Whistling Tree Ducks, the Crested Screamers, the Trumpeters and the Seriemas. (The native Muscovy Duck, Cairina moschata, is fully domesticated and, therefore, relatively well-known.)

The highly variable and widespread Curassows of the family Cracidae (Cracids, for short) range in size from the majestic, turkey-sized Greater Curassows (commonly called "Pavos" or "Gallipavos" in Spanish), to the pheasant-sized Guans, Paujis and Penelopes, to the bantam chicken-size Chachalacas. All the Cracids range over much of subtropical Latin America (with numerous and regionally-restricted individual species, of course) except where cold restricts them.

The Whistling Tree Ducks belong to the family Dendrocygnidae and, likewise, range over all of subtropical and tropical South America wherever wet habitats can be found.

The Crested Screamers of the family Anhimidae are an aberrant offshoot of the duck family, ranging over much of South America's swamplands and their adjacent grasslands.

The Trumpeters of the family Psophiidae range over South America's wet forests east of the Andes.

The Seriemas are the most restricted group, being confined to the area south of the Amazon Basin. They belong to the family Cariamidae.

Of course, there are a number

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of large and important groups of birds that I have never studied -- such as parrots, eagles and hawks, condors, storks, etc. I chose instead to concentrate on those groups which really "earned their way," birds which could be allowed to roam at will to accomplish the tasks that they were meant to perform.

Why this preference? Because I come from good, solid yeoman stock of no-nonsense Germans on my mother's side and hard-nosed Scotch Irish on the other -- practical people all. Thus, I am drawn to the pragmatic aspects of pet-keeping. Of course, I'm not a real farmer any more than I'm a true explorer of South America, but when it came time to pick a Ph.D. research theme, the old family ways asserted themselves.

The domestication of birds -- process and diffusion -- seemed like a fit subject for a biologist coming into geography. In addition, one professor, over a large number of cold beers at the local watering hole for educated cowboys (called the 'Dixie Chicken,' would you believe?) near Texas A&M University, converted me to the doctrine of functionalism.

The basic idea behind functionalism is that all cultural activities and artifacts are useful for something, or at least were once useful. The point is that tame birds proved so functional that they gave their owners an advantage over less 'civilized' groups. For example, in a tropical region overrun with a menagerie of prolific and hungry insects, bug catchers are at a premium. One Paraguayan tribe was wont to put their spare clothes in covered pots just to keep the local beetles from devouring them during the night. Moreover, alert and highly vocal sentinel birds have a definite survival value where there exists tribal warfare, warrior cults and cannibalism.

By way of illustration, the harem structure of Carib society gave the older warriors a corner on the market of women. A younger warrior desirous of a wife had to join with others in dawn raids on neighboring villages. (This practice reached such an extreme that the Island Caribs of the Lesser Antilles had two languages --- Arawak spoken by the women and a very corrupted Carib dialect used by the men which, however, was heavily influenced by the Arawak tongue of their mothers.) With neighbors like the Caribs, even the slightest warning of a sentinel-bird might well mean the difference between a successful defense and being served up as a barbequed breakfast steak by your erstwhile spouse or daughter at the behest of her brand new 'husband!' *Voila*, the functionalism of free-roaming tame birds!

In the same vein, Trumpeters, Screamers and Seriemas all enjoy good reputations as fierce fighters, scavengers, and snake-killers -- welcome companions in tropical villages where poisonous vipers abound, attracted to the vermin living around garbage dumps and likely to make themselves comfortable in thatched roofs and walls.

ONE PROFESSOR, over a large number of cold beers at the local watering hole...called the Dixie Chicken... converted me to the doctrine of functionalism.

Then, too, lucky villagers with a surplus of such fowl would have a supply of 'trade goods' when traveling up and down the river. A pair of live fowl raised aloft as one approached a strange village would likely be viewed as a sign of peaceful intent.

Also, feathers in a tropical climate disintegrate rapidly due to fungus and bacteria, requiring a brisk traffic to keep up appearances at important ceremonies. This is especially true in the New World where the Bird/Cat/Reptile trinity of religious motifs dominated much of Latin America. For example, witness the Plumed Serpent cult of Mexico, the Condor cult of the Andes, the Jaguar fixation everywhere and the dread of Cayman and Anaconda.

Furthermore, some Indians may even have specialized in taming certain birds (where they were locally abundant and easily obtained), just as others concentrated on making and trading dugout canoes, manioc scrapers, manioc pulp squeezers, etc.

A surplus of tame fowl over the number needed to maintain hygiene and security would be useful during periodic shortages after heavy flooding or drought. Indians able to maintain a stock of tame birds would have both a survival and competitive advantage over others.

The spread of Carib, Arawak and Tupi-Guarani names for these birds over much of South America indicates that these peoples may have been the most active at 'discovering' useful tame birds. At the very least, they would appear most active in adopting new taming techniques as they developed and certain the most active in spreading them.

As the practice of keeping tame birds spread from one group to another, so did their names. The receiving people would, of course, have names for the wild birds as game animals, but to differentiate the tame variety would come to use either a new name or, at least, an adjective added to the old name. Often the new name for a tame bird was shorter, or more distinctive or more convenient. Thus, these bird names (and the place names that eventually go along with them) can be used to trace cultural diffusion, conquest, trade and other such cultural processes. (These words which linguistic analysis shows to be related are called 'cognates.')

Suppose you fail to encounter even a single specimen of these tame birds during one of your forays. Don't be surprised. The local appetite for roast bird may outweigh their desire for tame birds. Even where people value tame birds, finding nests to rob may be a tough order where hunting pressure and habitat destruction has reduced bird populations.

Indian men on hunting trips and women foraging carefully note nest locations of favored birds. These are raided at appropriate times for eggs or fledglings which are placed with a domestic hen or even a Muscovy Duck. In many areas, the use of domestic chickens, turkeys and peafowl may have largely superceded their native counterparts (such as the Cracids, that are even biologically related), because they breed more easily, regularly and abundantly in captivity.

Native birds rarely breed in captivity for a variety of reasons. Courtship rituals and mating behavior may require considerable space in the wild -- conditions which human activities interfere with to a fatal degree. Also, young birds often 'imprint' at an early stage on human masters or other animals or birds (like Mallard ducklings are known to do) and, thus, they short-circuit their reproductive urges by failing to recognize their species as appropriate mates. Others are simply too nervous to set on eggs when

near humans. Removal from their natural environment may simply leave them too exposed to reproduce successfully or, at least, not often enough to produce the desired numbers.

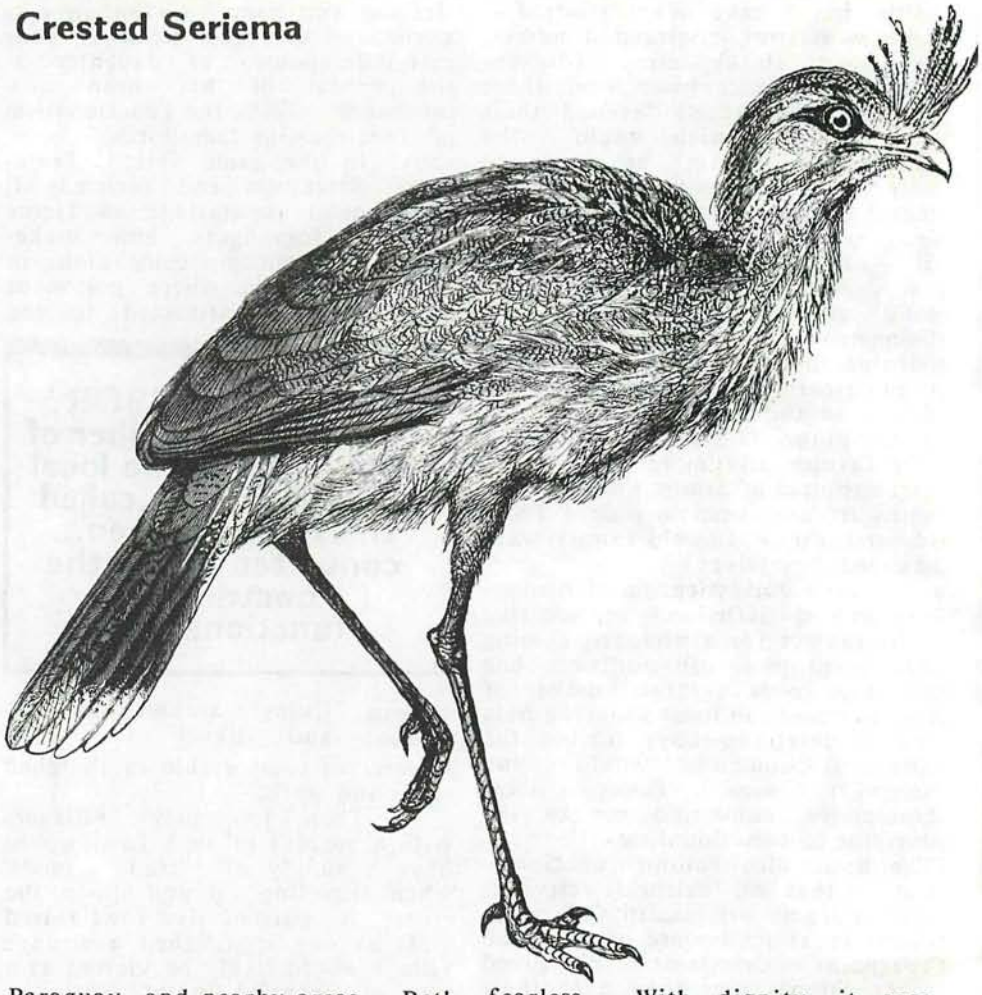
On the other hand, the widespread introduction of domestic chickens, turkeys, and Mallard ducks may have actually enhanced the survival and use of native tame birds. Where there are wild stocks for 'recruiting,' domestic hens and ducks serve to hatch the eggs and rear young native birds. The formidable sentinel birds can then guard the weaker chickens, their foster parents.

Indians quickly recognized the usefulness of chickens, turkeys, etc. which readily reproduce, though chickens are less efficient vermin-killers than the larger, more aggressive native birds.

The main types of tame birds may already be familiar to you from trips to zoos and aviaries. Crested Screamers, Trumpeters, Seriemas, Whistling Tree Ducks and especially Curassaws all thrive in zoos for some of the same reasons that make them attractive as pets and barnyard fowl. They adapt well to captivity, are hardy and sociable with other birds, and easy to feed and care for (as opposed to some of the smaller, more delicate and colorful tropical birds). Unfortunately, the useful tame birds tend to be more drab, calmer and more aloof than the colorful and hyperactive birds that attract tourist attention. However, since my readers are by no means ordinary tourists, I will direct your attention to the useful tame birds. You can then delight in recognizing their significance where others fail to notice them at all.

Personally, I never fail to feel a surge of joy when I see tame birds in zoos. I usually take this opportunity to launch into an unsolicited monologue to any and all present concerning their historical merit. Everybody likes to show off his 'pet frog.'

Crested Seriema



The birds I studied least are the Seriemas. The Seriemas are a small and regionally restricted group with only two species. Both closely resemble the African Secretary Bird in habit and appearance. The larger and more widespread Crested Cariamas (Cariamas cristata) is found in the high grasses of southern and eastern Brazil. The smaller, more restricted Burmeister's Seriema (Chunga burmeisteri) lives in the open thorn forest ecosystem of Paraguay and nearby areas. Both are tall (about 50cm high), long-legged, dull-brown birds. They run along the ground in search of prey, escaping when approached by running swiftly in a stooping posture to avoid detection. They fly only when hard pressed. Seriemas are omnivorous and regularly eat all manner of small snakes, making them highly regarded in Brazil where they are protected by law. They are also adept at catching mice, snakes and harmful insects. Unfortunately, they are also gamebirds and, therefore, wary of humans.

Nonetheless, both do well in captivity if captured young. They are widely valued as watchbirds due to their alertness and loud, screaming cry. They breed well in captivity but will devour their own young if disturbed -- a well known stress reaction among such neurotic species as mink, chinchillas and hamsters. Both become attached to their masters. Seriemas are loyal and attentive pets, endearing themselves to their masters with amusing manners and curiosity.

William Beebe reported that his pet Seriema was both gentle and fearless. With dignity, it occasionally stalked solemnly into his office where it watched him closely as he worked at his desk. Likewise, Sir John Graham Kerr related, in the warm and affectionate tones used by all proud pet owners, how his pet slept on a beam overhanging the foot of his bed and accompanied him on walks, eating frogs which his master speared for him and chasing the neighboring missionaries' chickens. Kerr's Seriema occasionally stole his lab asssistant's small animal specimens from right under his nose. Unfortunately, one day it sadly chose to consume a rat skin preserved in arsenic soap.

Amerindian names for these two birds give some insight into the migration of the Tupi Indians up the southeast Brazilian coast. *Chunnia* or *Chunnnia* are names used primarily to designate the smaller Burmeister's Seriema (Chunga burmeisteri), and *Chunnia* cognates as place names are found inside this bird's range. The more easterly Crested Cariama (Cariama cristata) is usually called *Seriema* (meaning 'small rhea' in Tupi), *Siriema*, *Saria* or *Cariama*. These names (both as

bird and place names) are found mostly in Brazil. These Seriema names were probably carried northeast along the Brazilian coast by the Tupi Indians, who are also responsible for introducing the snake-killing Seriema birds as useful pets.

Next are the Trumpeters of the family Psophiidae. They are related to the bustards, rails and look like small cranes themselves. Only three species exist, each common to one of the three major South American river basins: The Common Trumpeter (Psophia crepitans), the Orinoco; the Green-Winged Trumpeter (Psophia viridis), the Amazon; and the White-Winged Trumpeter (Psophia leucoptera), the Paraguay.

All are similar in appearance except for minor color variations. They stand about 50cm high and are covered with dark, soft plumage -- feathers of rich irridescent blues, dark purple and even green. They live on the floor of lowland jungles and moist forests, eating all sorts of small animals, insects and vegetable matter. They have long legs and necks with fowl-like beaks and possess great visual acuity. It is said that a Trumpeter can peck a mosquito from the cheek of a sleeping child without waking it.

The name 'Trumpeter' comes from the bird's loud, strident cry, 'ventriloquistic' in nature. It is thought that the call originates deep in the throat and chest, resonating up through the complex airways that muffle it. For this reason, it seems to come from farther away than it does.

Trumpeters are weak-winged and prefer to run from danger. They have a characteristic 'hump-backed' posture. You may only get to see them as pets, because they are tasty and easy game for hunters.

Amusing and exuberant acrobatic courtship displays (similar to those of their bustard cousins) make Trumpeters attractive subjects in reports of travelers and naturalists. When displaying, Trumpeters stand on one leg, hopping about, skip, dance, turn summersaults, flaunt their half-spread wings as if in threat. Darting here and there with bursts of speed, they are hard to ignore (unlike some of the other more inhibited tame birds which are shy in the presence of strangers).

The fighting abilities of Trumpeters are notable. They fearlessly attack animals several times their size (hogs, dogs, tame curassows, chickens, etc.) using 'game cock' tactics -- flapping into an opponent's face and scratching furiously or hopping on an opponent's back and pecking violently. Such pugnacity is not all bluff since they are greatly excited by fresh meat and have been known to stalk and kill full grown snakes.

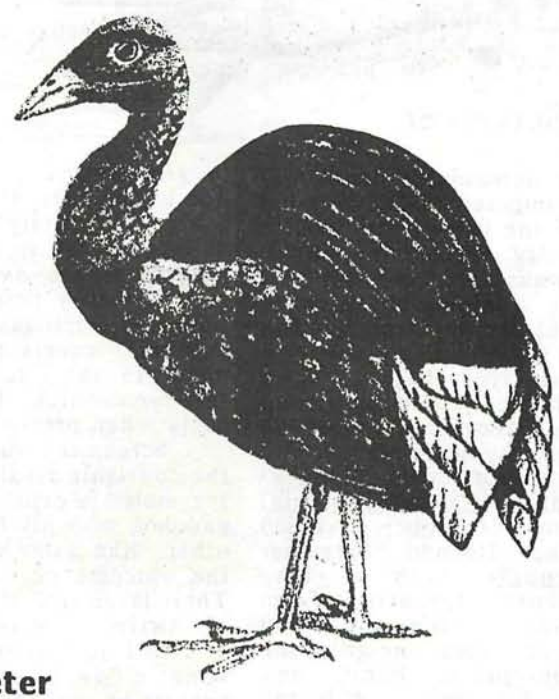
On the other hand, Trumpeters make affectionate pets. They follow their masters around and are fond of being petted. Trumpters love to have their long necks scratched and will sometimes jealously peck other animals who seek their master's attention. At the approach of strangers, they sound alarm and will sometimes peck angrily at the legs of people they dislike. Similar aggression directed towards predators of barnyard fowl, or even herds of animals to which the Trumpeter has become attached, has gained the bird a reputation as shepherd, guardian and watchbird. The Trumpeter is often called 'Justice of the Peace' both for its dark color and humped back, as well as for its intolerance of disturbances. It will break up fights among barnyard fowl. Clearly, Trumpeters dominate the local 'pecking order.'

In cultural history, the names for Trumpeters are rather interesting. They indicate not only the important role of the Carib Indian in taming Trumpeters in ancient times, but the diffusion of this practice in more recent times from the Caribs of the northern quadrant of South America into Tupi area to the south. The names hint that Trumpeters may have been 'domesticated' before Screamers (which also inhabit nearby wetlands) and may have served as a 'model' for the taming of Screamers. That is, some of the names for Screamers seem to derive from certain Trumpeter names. The theory goes something like this:

First of all, most reports of tame Trumpeters come from north of the Amazon (where Carib influence was strongest) and, secondly, Indian names for Trumpeters there show greater diversity (indicated by the great number of years needed for dialects to form). By contrast, Tupi names to the south are quite uniform and show little variation -- probably because they were borrowed from the Caribs relatively recently and, thus, have had little time to be mangled and confused by ordinary human carelessness, everyday usage and isolation. Trumpeters are usually called *Jacami*, *Yakami*, *Kami-kami*, *Agami* or some very similar and easily recognizable variation of these cognates (even in the Carib hearth zone).

The usefulness of Trumpeters as aggressive snake killers and watchbirds is an obvious selling point which goes a long way toward explaining the rapid adoption of *Agami* (meaning 'tame Trumpeter') by the more southerly Tupi Indians.

Next, let us examine the tame Screamer birds. Their goose-like trumpeting call is twice as loud as a peacock's and carries



Trumpeter

twice as far -- up to three kilometers!). Not only do they call while on the ground, but after an awkward take-off, they often soar high above the jungles in the manner of vultures and occasionally sing melodiously from great heights. On land they walk slowly in a stately fashion, congregating in large flocks during the non-breeding season to 'sing' in concert. Such concerts must be quite an experience in the wild.

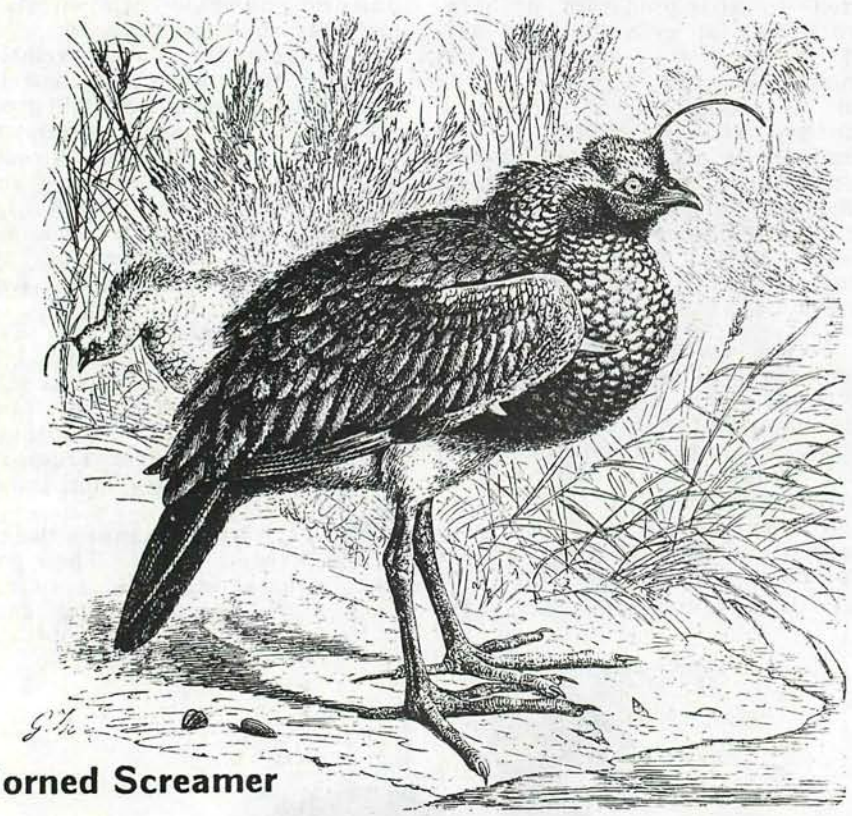
Screamer names are linguistically related to those of tame Trumpeter birds because of the probable derivation of the name *Kami-chi* for Screamer from *Kami-kami* for Trumpeter. The Crested Screamers of the family Anhimidae are biologically related to ducks, geese and swans, and possess several peculiar anatomical features. The group has only two genera and three species (again associated with the three main river basins, as in the case of the Trumpeters), and all are inter-fertile when cross-bred in zoos, usually by accident.

The restricted Black-Necked Screamer (Chauna chavaria) is limited to the upper Orinoco basin. The Horned Screamer (Anhima cornuta), with a long and thin 'horn' sprouting from the forehead) occupies the Amazon basin and neighboring areas of appropriate habit, and the Crested Screamer (Chauna cristata) occupies the Paraguyan basin.

These three species are very similar in size and behavior, all being large, turkey-sized birds living in wet savannas, swamps and adjacent grasslands where they feed, like ducks, on aquatic vegetation. Their massive-looking legs with long toes support them while walking on top of the floating islands of vegetation in jungle lakes.

Screamers appear quite heavy and ponderous in captivity, but actually are surprisingly light. They swim so well and with such ease that they are often compared to grey swans. This lightness is due to the fact that Screamers possess 'pneumaticity' (i.e., hollowness of the bones) to the highest degree known in the avian world. In addition, they possess a sponge-like, bubbly air-cell layer just under the skin that covers their bodies clear down to the toes (Incidentally, this 6-mm-thick layer crackles audibly when pressed with a finger.)

Screamers mate for life, and the courtship rivalry of the breeding males is exploited by Argentine gauchos who pit them against each other like game cocks, betting on the outcome of this cruel sport. Their large size, the protruding pair of sharp, bony, 25mm spurs attached just above and below the wing elbow, together with their aggressive and threatening behavior when aroused (like angry geese), make them formidable opponents. Their particular enemies are the birds of prey, especially the Jabiru Stork, which Screamers despise the same way that crows hate owls. Screamers harass Storks in the air like some birds worry marauding hawks when they get too near their nests.



Horned Screamer

Screamers are sociable with barnyard fowl and take on protective watchbird attitudes toward the flock that adopts them. It is hardly necessary to explain the favor tame Screamers find among poultry raisers, especially the rustic backwoodsmen of Brazil's hinterland. An adult male tame Screamer has been known to adopt as many as 40 chicks of domestic fowl. It will gingerly step around the chicks and ward off intruders, even cats and dogs, with the well-known hissing threats of the domestic goose.

What is it that keeps the capative bird from flying off? What keeps them with their their masters? W. H. Hudson described the poignant experience of his tame Screamer which periodically attempted to rejoin wild flocks when they appeared on a nearby lake. Sadly, it was always repelled violently by its wild brethren and so was forced to return, crest-fallen, to domesticity. Perhaps it simply did not fit into their pecking order, or tried to court a mated female or had inadvertently changed its behavior or smelled differently because of its barnyard diet. Whatever the case, it was too alien to be tolerated.

Given that Screamers are a most gregarious species, its was probably driven by loneliness to start a flock of its own. Baby chicks would accept it without question. It may even be a general principle that tame birds can roam at will, but stay near their human masters simply because they have little or no choice about returning to their wild kin.

At any rate, Screamers (wild or tame) resent strangers in their territory, whether animal or human and serve as sentries for all inhabitants of their area. One visitor, while playing a tape recording of Screamer calls, was startled when sleeping dogs jumped up and rushed outside barking furiously, anticipating an intruder. *Should* you arrive at night in a village and experience such a reception, you will not easily forget it.

On the other hand, some tame Screamers become so accustomed to traffic (in busy places

such as the La Plata area of Argentina) that one traveler had to shoo them away from the hitching rail in order to tie up his steed.

Like the three species, names for Screamers divide into three clear-cut groups, indicating some obvious cultural boundaries. In the southernmost area (Argentina, Paraguay and Uruguay), the names *Chaja*, *Chaha* and *Chaka* are sometimes used as place names -- particularly for mountain passes, etc. There winds skrieking through the terrain may well remind natives of the Screamer's call. Since the word *chacha* is a native word widely used in Latin America to designate 'loud, noisy, chattering,' it is not surprising that the Screamer should bear such a name within the Guarini area. Elsewhere the word *chacha* is used to signify the Cracids, as the name *Chachalaca*, smallest and most widespread of these noisy birds.

In the Brazilian Highlands and surrounding area, cognates of *Anhuma* or *Inhima* are common for both bird and place names. Among the place names (along watercourses, naturally, since the Screamers are water birds), a clear cut cultural boundary is seen between the Paraguay/S.W. Brazil region dominated by the Tupi Indian group and the main Brazilian Highlands dominated by the linguistically distinct Ge Indian group. That is, if you draw a line straight northwest from Sao Paulo, the place names are *Inhuma* to the north of that line and *Anhuma* to the south. Since most of the place names (more slowly adopted than mere bird names) are north of this line, within the Ge Indian hearth zone, I assume that the expanding Tupi borrowed this name from the Ge.

Having discussed the Crested Screamers as aberrant ducks, let me move along to the Whistling Tree Ducks, hardly your common garden-variety, domestic Mallard.

The four species of the family Dendrocygnidae found in the New World are the key useful tame birds within the duck group. By analysing their native names we can determine cultural migrations and contacts.

Whistling Tree Ducks are more like small geese than the familiar Mallards of the barnyard. They have long legs and necks, an upright posture and, of course, whistling voices which make them stand out somewhat from the more familiar waterfowl known to the sportsman. Some nest in the hollows of trees, from which the young must eventually jump -- bouncing like little yellow and black, fluffy ping-pong balls (entirely unhurt, would you believe?). However, occasionally a hen will 'ferry' her young if the nest is especially high, carrying them down one at a time on her back.

Other Whistling Tree Ducks build tent-like nests in the reeds -- occasionally forming either colonial nests or 'dump nests' for up to 40 excess eggs.

As I said, there are four species of this very widespread family in the New World, including the Cuban Tree Duck (Dendrocygna arborea) whose native name is often *Yaguasa*. This name is linked to the names of the fully domesticated and native American Muscovy Duck. (This may indicate that the Muscovy Duck was domesticated first and later used to hatch the soon-to-be-tamed Tree Ducks. Hence the name link). In any case, early Arawak Indians may have already kept Tree Ducks when they colonized the Antilles several thousand years ago. Even today Cubans keep tame Tree Ducks on their ponds to decoy large flocks of their wild brethren.

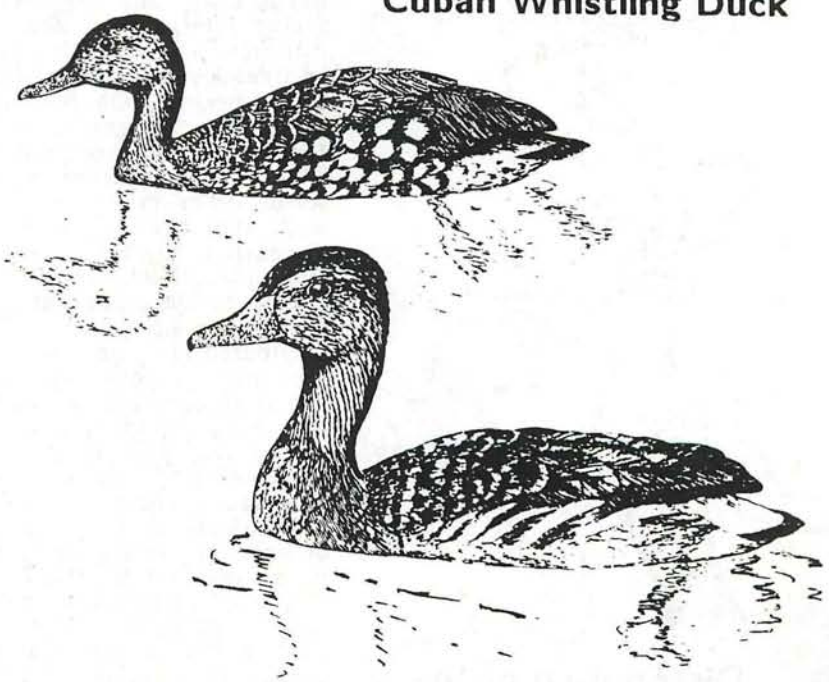
The other three species are:

1.) The Black-bellied Tree Duck Dendrocygna autumnalis), a sort of duck cartoon-figure of an English squire in a rust-colored top coat, black pants and white sash.

2.) The Fulvous Tree Duck (Dendrocygna bicolor), resembles a duck caricature of one of Mussolini's 'tan shirts' of wartime Italy -- military jackboot legs, upright strutting gait, tawny and reddish brown uniform complete with a black 'fez' topknot and flashy white 'hash marks' on the sleeves.

3.) The Whitefaced Tree Duck (Dendrocygna viduata), resembles nothing so much a duck in nun's garb, with a stark white face and collar, while the back of the head and neck (as well as the breast) are discreetly covered in contrasting black cowl and habit.

All inhabit the warm, swampy wetlands from Mexico to Argentina in overlapping ranges, feeding on a variety of crustaceans, insects and vegetable matter. All possess the same soft charm when kept in captivity. Their piping voices are amusing as they follow you around. I observed that zoo specimens in Houston learned to make cute 'rubber-ducky' squeaks and chirps as they 'goose-stepped' around the enclosure to get visitors to share their popcorn with the little beggars. Not a bad racket compared to a risky life in the wild where their sympathetic nature (they will circle a wounded mate, whistling reassuringly) makes them easy prey for a sportsman. In more isolated areas, their musical



Cuban Whistling Duck

Fulvous Whistling Duck

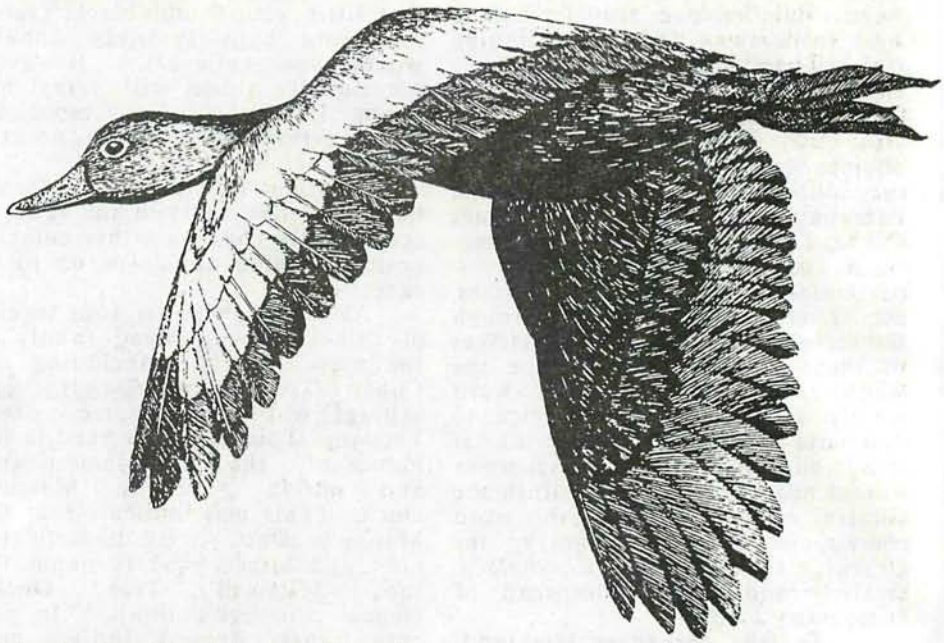
whistles warn of strangers at night. (Tree Ducks are largely nocturnal in the wild.)

Wild Tree Ducks are abound in the extensive wetlands of South America. You may see more Tree Ducks than any other type of tame bird (except possibly the Cracids). Although tasty and easy prey, their semi-migratory habits and aquatic environment afford them greater protection from human predation than the sedentary, ground-dwelling Trumpeters and Seriemas.

On the other hand, Tree Ducks love domestic grain -- especially rice, sorghum and maize -- and often, in large flocks, visit fields by night, doing considerable damage. They tend to nest in large numbers near such food supplies, making them easy prey for farmers. Those that do not end up on the dinner table are available for taming, earning their keep by eating all sorts of bugs common to every warm climate garden, lawn or barnyard.

Native names for Tree Ducks point to two major cultural thrusts: The older group of cognates is a diverse group of names usually similar to the main forms, *Pishishi*, *Bichichi*, *Wisisi*, *Pijiji*, *Pixixe*, *Pee-hee-hee*, etc. This group covers a large area resembling an upside-down 'Y,' the stem of the 'Y' in Central America and the two

Distribution of the Fulvous Whistling Duck



Black-Bellied Tree Duck

arms running down the coastlines of northern South America on both sides to the Equator. It seems likely that these names were brought north to Central America as part of what some authors call the 'Inter-American Formative Period,' along with a number of other basic traits, such as the use of root crops like manioc.

The other group of cognates, based on *Iriri*, seems to have superceded the *Pishishi-Pijije* group in most of South America (the Amazon Basin, Brazil and Argentina). There are no *Pishishi* place names in South America, although there are *Pijije* and *Pee-hee-hay* place names in Central America. On the other hand, there are numerous *Iriri* place names over much of South America. This indicates (based on the analysis of other tame bird cognates as well) that the *Iriri* forms replaced the earlier *Pishishi* forms. The Tree Duck place names in South America belong to the newer group of cognates (*Iriri*, i.e. which seems to have originated in the Guiana-Brazilia area and spread southeast along the Brazilian coast all the way down to the Paraguayan region). Their abundance, wide range, and diversity indicate Guiana as the center of origin. The process of developing dialects takes time, and the area of greatest divergence of words can be assumed to be the hearth area. The *Iriri* names which include *Irere*, *Arere*, *Chiridri*, *Guiriri*, *Suiriri*, *Churiri*, *Kaviriri*, and *Cawiriri* are so similar in form that they are easy to recognize as related and, thus, recognized as a 'newer' development than the other, more diverse *Pishishi* and *Pee-hee-hee* names.

I suspect that the Arawak Indians are the originators of these newer names since the name *Chiriria* is found in Hispanola, an area Arawaks were known to have colonized before the birth of Christ. To the south, the Tupi along the Brazilian coast may have picked up *Iriri* names, along with the use of tame Tree Ducks (I suspect).

So, you see, the Tree Duck name study indicates two trends -- an older 'root crop' diffusion from the vicinity of Venezuela to Central and Meso-America, and a more recent Arawak-related spread outward, north and south, from Guiana.

Now for the last and most important group of useful tame birds -- the Cracids. The Curassows are by far the most varied and most numerous group of useful tame birds. The family Cracidae is part of the Galliformes, or 'chicken-like birds,' which includes turkeys, chickens, peafowl, quail and pheasants. They resemble their relatives closely in appearance and come in a variety of sizes, features and habitats. The Curassow family varies from the bantam-sized *Chachalacas* to the pheasant-sized Guans to the turkey-sized Greater Curassows. All are common useful tame birds wherever they are available. They belong to the subtropical and tropical damp forests and woodlands, except for the smallest, the *Chachalacas*,

which inhabit dry, open parklands and dense brush thickets.

The Cracids like to feed on buds and tender leaves, fallen fruit, flowers and occasional live 'targets of opportunity' such as insects and frogs. They are inquisitive birds that require grit for their muscular stomachs and, for this purpose, ingest all manner of human artifacts. The grinding action of the gizzard is so vigorous that it renders even metal objects like coins and buttons almost unrecognizable according to accounts of several disgruntled early settlers.

With their long, well-developed tails and short, rounded, concave wings, all Cracids are good fliers, but the most preferred mode of travel or escape seems to be a series of short glides or hops from tree to tree. Cracids mate for life and both parents care for the young.

Cracids are generally gentle birds, except during mating, territorial defense or peck-order disputes (quickly settled). They tame easily and mix peacefully with barnyard fowl. Cracids are occasionally aggressive with small children and visitors and have been known to bully them in the manner of domestic ganders and game cocks.

Cracids don't breed in zoos, but in the loose captivity of the Amerindian villages, they may wander out into the forest fringes where their mating rituals and breeding/rearing activities are not inhibited. Thus, they may successfully rear chicks even in the tame state.

Monogamous pairing, small clutch size, the necessity of 'spoon feeding' chicks for an extended period, shyness during breeding and preference for nesting sites away from human habitations, have all been major problems in bringing Cracids to a state of full domestication.

Cracids were once valued exotic pets, prized imports in Europe (especially France) and the U.S. during the 1800s when numerous attempts to breed them in captivity were made. However, omnivorous eating habits caused extensive damage to all manner of European crops, fruits or ornamental plants, and aggressive behavior eroded their popularity.

In ancient Meso-America, tame Cracids were quite popular for their plumage which adorned altars and figured in the blue-black mosaics required by high priests for ritual. This was especially so for rites associated with Quetzalcoatl (the Plumed Serpent), who, in his aspect as Sun God, wore Curassow 'pheasant' feathers in a distinctive conical hat.

The Mayan god Kukulcan (the Aztec Quetzalcoatl by another name) was also the Corn God called Ghanan or Yum Caax in one of his multiple aspects. The name *Ghanan* may be related to the word *Guan* (the Mexican pheasant or medium-sized Cracid), and the word *Caax* (also *Kosh*, or *Kaax*) still means 'curassow' in Mayan speech.

So you can see that the study of bird names can lead to insights into ancient cultures. In fact, the need for tame birds for ritual purposes may very well account for the whole practice of domesticating birds and animals.

Curassow

As for South American Indians, their use of feathers is more mundane. In many places the chief reason for hunting or keeping the Cracids is to get feathers. Feathers, stored in small baskets, constitute a sort of currency being readily negotiable and of stable value.

Indians also yank out the tail and wing feathers of tame Cracids for arrow guides. Of course, a bird, once denuded of useful feathers, is often pitched into the ever-simmering pepper pot.

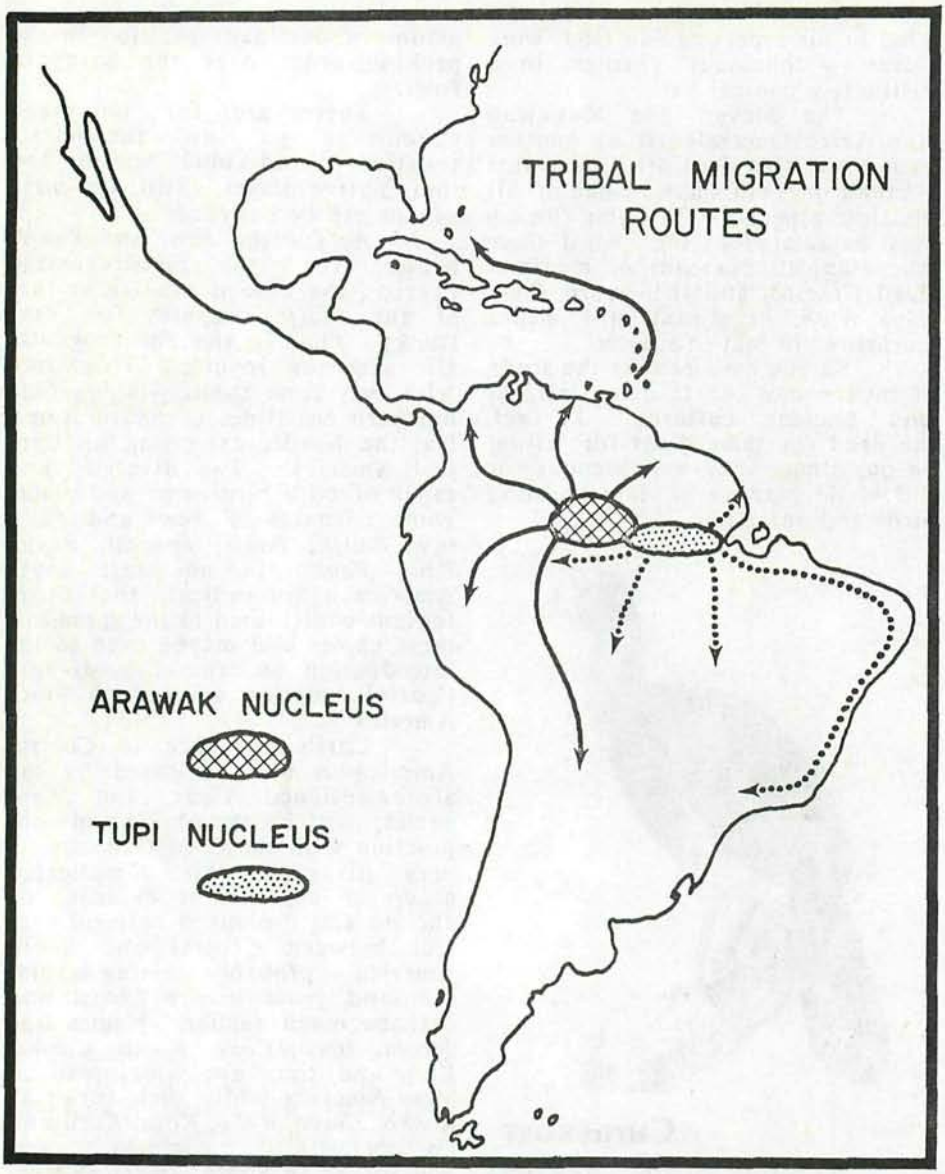
As tame pets, Cracids often imprint on humans. There are reports of Cracids pecking at the legs of their master to be held and scratched. Cracids will roost in the rafters above their master's bed. Here they coo in their sleep a sort of snoring lullaby. They will also nestle up to their master and hide their heads in the folds of his clothing as wild Cracids do in the feathers of their mother. Such familiarity may lead a Cracid to assume a dominant position in the pecking order over the barnyard fowl.

There are far too many Cracids to go into the characteristics of individual species and their native names. Still, the main groups can be outlined:

As for the *Powi* and *Paujih* names for the medium-sized Cracids, the case is similar to that of the *Pijije* cognates for Tree Ducks. That is, the *Powi* cognates also show an inverted 'Y' pattern with two arms running along both northern coastlines of South America, the handle extending up Central America. The diversity and range of both bird-name and place-name cognates of *Powi* and *Pauji* (e.g. *Paujil*, *Powis*, *Powishi*, *Pauxi*, *Paui*, *Pauhi*) in northeast South America again indicate that Carib Indians contributed to the spread of these names and maybe even to the introduction of tame Cracids into Central America, as well as South America.

Carib influence in Central America is also indicated by the aforementioned *Caax* and *Kosh* names, used by the Mayans in conjunction with the Corn God. By its very diversity, this complicated group of cognates is evidence of ancient and prolonged cultural contact between Central and South America -- probably starting several thousand years before Christ and perhaps much earlier. Names like *Jocota*, *Hoco*, *Coxo*, *Kosho*, *Coosoo*, *Kusu* and *Cutz* are widespread in Meso-America while such forms as *Kokko*, *Hocco*, *Woko*, *Kosa*, *Kucu* and *Cochobi* are common and widespread in South America, especially in the Carib-Arawak cultural areas of the northern quadrant. The main question is not whether the Meso-Americans got these cognates from South America, but whether they also received the idea of taming Cracids from the south, as well. I suspect so.

Likewise, the common word *Guan* (used widely to designate the medium-sized, pheasant-like forms) is, with simple variations, widespread in Central America, while also related to the even more extensive and diverse cognate group based on the root word *Aracuan*. Also, the *Guan-Aracuan* cognate group, in the case of the *Kosho-Hooco* cognateas, points to a cultural spread from South America to Meso-America. The *Guan* cognates include *Guanajo* (Aztec), *Quam*, *Kambul*, *Quaheene*, *Hannaqua*, etc. The *Aracuam* (Tupi), *Paraka* (Carib), *Karaku*, *Characu*, etc., and even today *Karaka*, are widespread Indian names applied to the



Curassow look-alike relatives introduced from the old world -- the ubiquitous chicken.

For obvious reasons of similarity, behavior and use, the chicken was given a Curassow name when introduced to the Indians. Names such as *Karaka*, *Kalaka*, *Kaka-kaka*, and *Chacha* from South America became *Chachalaca-metl*, *Chachalaca-tli* and *Chachalaca-totolli* in Aztec and, thus, our modern form *Chachalaca* for the smallest Cracids.

Clearly Tupian in origin is the *Mutum* group of cognates found mostly south of the Amazon over a wide area surrounding the Brazilian Highlands. *Mutum* becomes *Mitu* in Guarani languages found to the southwest of Brazil. These cognates are easily recognizable and probably related to comparatively recent (i.e. in the last 1,000 years) expansion of the Tupi, from somewhere in the area of Bolivia outward and around the Brazilian Highlands' northern boundary and at the same time stretching around the southern Brazilian coastline south of the Brazilian Highlands, in a pincer movement.

Even more clearly Tupi-Guarani are the *Yaku* and *Jacu* forms found both as bird names and place names from Paraguay to eastern Brazil in a comma-shaped pattern whose round, wide base in the Tupi-Guarani hearth of northern Argentina plainly shows the influence which thins and tails out as one progresses toward the hump of Brazil's eastern coast.

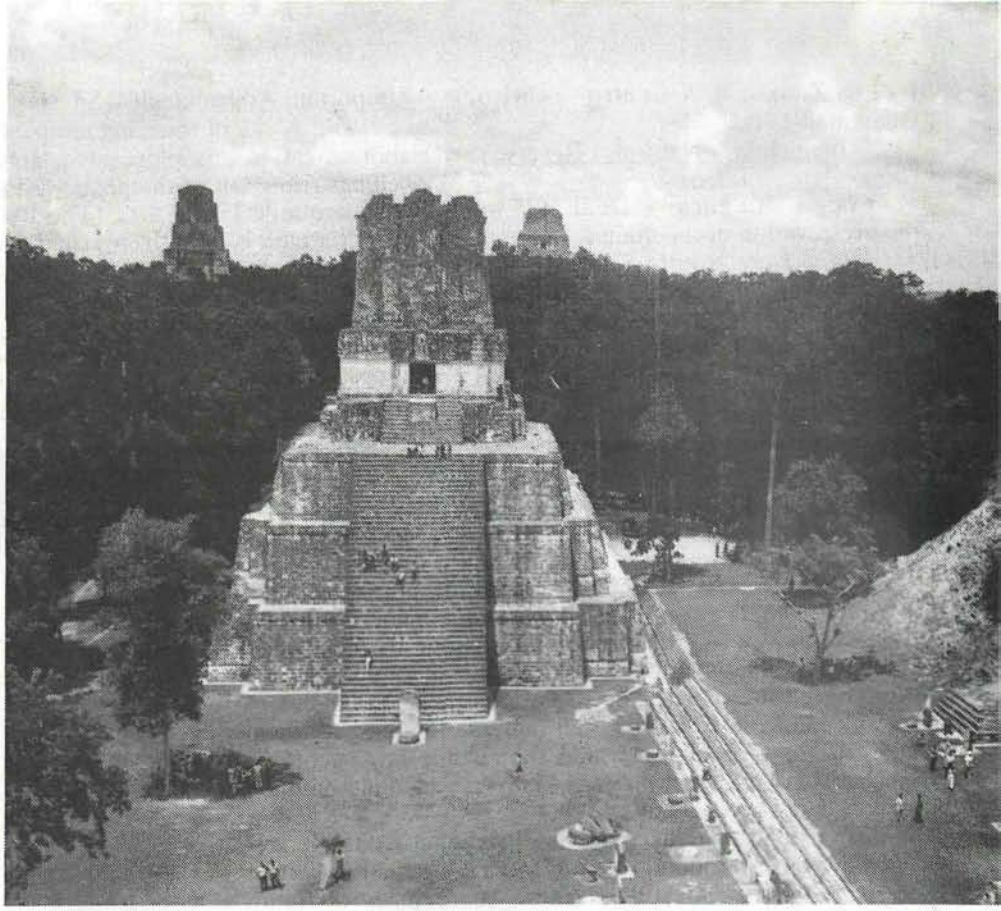
This brief outline of the Curassow family's importance in the scheme of Amerindian culture indicates extensive migration and diffusion by major tribal groups. These movements in most cases are already well-known. For example, it is no secret that the Tupi moved up the Brazilian coast in relatively recent times and it is well established that the Caribs usurped much of the formerly Arawak cultural realm.

My work re-confirms this and expands upon the knowledge of migration routes by plotting the distribution of bird versus place names. This is a preliminary exercise in order to test and prove the usefulness of my method (which, incidentally, is called Worten und Sachen or "Words and Things" in German). The results also support the idea of regular, long-term contact and important cultural diffusion, even in relatively recent times (i.e., the last 1,000 years or so) between South America and MesoAmerica, a concept which is by no means old hat, nor taken for granted. In fact, this idea of long-term, long-range regular contact is quite controversial, although evidence gradually mounts that South American/MesoAmerican contacts may have been much more extensive than previously thought, even if Montezuma didn't exactly have a personal envoy at the court of the Inca.

The presence of bronze trade axes (much too small for actual use) in western Mexico in the centuries before European contact has been attributed to a seemingly one-way contact with Peru, since no Mexican artifacts have been found in Peru. However, it has recently been suggested by Mountjoy that the Mexican Indians were trading hallucinogenic mushrooms, peyote cactus buttons, etc. for these bronze goods. This would explain the lack of MesoAmerican 'hardware' in Peru. These drugs are highly prized and difficult to come by (making them attractive trade goods in a hemisphere where 'communing with the gods' was common ritual), but are highly perishable. They would have left little archaeological record. In the same vein, tame Curassows and other tame birds left no distinguishing archaeological evidence of prolonged contacts between peoples in distant regions. But linguistic analysis reveals clear connections.

In any case, there you have it -- the useful tame birds of South America, a la Whitley. Oh, yes, I have neglected some other bird groups worthy of mention, both major and minor, and I have played fast and loose with linguistics and anthropology in the process, but at least you have something to stimulate your own imagination and studies. ∎

UP NORTH



RUINS of Tikal

DRAMATIC breakthroughs in deciphering the complex writing system of the Mayas is changing the history of this elaborate civilization and causing old chapters to be rewritten.

For the better part of 150 years, scholars studying Maya relics have interpreted Maya imagery as depicting mystical priests and dieties engaged in astronomical study. The enormous pyramids and vast archaeological remains were believed to be the creations of a contemplative, peaceful, pious and worldly people up until the 9th century, at least, when the Mayas were assumed to have adopted the bloody sacrificial rites of the northern Teotihuacan culture of central Mexico. This view is now largely discredited.

Starting in the early 1960s, researchers began to decode the Maya hieroglyphics in earnest. Maya monuments, it was demonstrated, contained "emblem glyphs," which referred to a city of origin.

Next, it was shown that a series of inscriptions signified such concepts as birth, war, marriage, and death. Individual glyphs identified rulers. Suddenly Maya history was studded with names of kings such as Shield Jaguar of Yaxchilan, Yax-Pac of Copan, Pacal of Palenque, to name but a few.

Researchers have since proved that Maya hieroglyphics are, indeed, a genuine system of writing, possessing grammatical structure and phonetic symbols.

It is now clear that there are three types of glyphs -- pictographs representing complete words, phonetic signs, and semantic signs specifying which of several possible meanings is intended. Individual glyphs serve multiple functions, and there are different glyphs for the same sound. Translating Maya inscriptions is becoming matter of fact as researchers understand the arrangement of verbs, objects, subjects and the punctuation. Maya scholars estimate that fully 3/4 of the glyphs presently found on monuments have been translated.

What emerges from this new look at Maya culture is a civilization well versed in bloody rituals, a society that needed no instruction in these arts from northern invaders.

The new insight on the Maya, especially during the Classic Period (200 A.D. to 900 A.D.), is graphically set forth in *The Blood of Kings: Dynasty and Ritual in Maya Art*. Written by art historians Linda Schele and Mary Ellen Miller, the book gives vivid descriptions of the bloody rituals practiced. Maya royalty considered it their duty as descendants of gods to ritually bleed and mutilate themselves. Such rites demonstrated divine lineage. Before a war, a king would puncture his penis with a spine of a stingray or a jade or obsidian lancet. His queen used a thorn-encrusted rope to pierce her tongue. Massive blood-letting produced hallucinations during which the king and queen entered into contact with their gods and dead ancestors.

The authors show that warfare between Maya cities was common, its purpose to capture rival royalty for torture and sacrifice, not territorial expansion. Captives were frequently forced to compete with the conquering king in a rigged ballgame. Sacrifice and often decapitation was the lot of the losing captives.

Such practices, though frequent themes in Maya stone relief, sculpture and painting, were often ignored or misinterpreted until the breakthroughs in decoding. Maya culture is also now credited with developing a complex "day count" calendar some 16 centuries before a similar system appears in Europe. Kings employed the calendar to fix the birthdates of gods, and warfare was conducted in strict accordance with mathematical calculations.

****

In addition to the wondrous cities of the ancient Maya, visitors can now look forward to further revelations as work begins on El Mirador. This vast ruin is of such staggering proportions that it dwarfs such sites as Tikal and other favorite archaeological meccas. Visitors to Guatemala should contact:

*LACSA has started direct flights between New York's JFK Airport and Guatemala City.

*Visitors to Guatemala can get information from the **Guatemala Tourist Commission**, P. O. Box 144351, Coral Gables, Florida 33114-4351, or the Guatemala Tourist Commission (INGUAT), 7a. Avenida

1-17, Zona 4, Centro Civico, Guatemala City.

*Guatemala Natural Reserves (Biotopos):

Chocon Machacas -- Dedicated to the preservation of the manatee.

Mario Dary Rivera Biotopo -- Is dedicated to the quetzal, the national bird.

Cerro Cahuí Biotopo -- For the preservation of the wild turkey and other birds.

*Important Archaeological Sites:

Tikal: A city of towering temples, elaborate carvings, sophisticated stone dwellings rising out of the jungle in the 222-square-mile Tikal Park. (The 1987 Tikal Triathlon is tentatively scheduled for December 5th.)

Ceibal -- Often called the "Mayan Art Gallery," Ceibal boasts the finest and best preserved sculptures of the late Classical period.

Yaxha -- Remarkable urban network of streets faced with structures arranged in quadrangles.

El Mirador -- The most massive ceremonial structures are found here in greater numbers than any other site.

*Write *Archaeology* magazine for its listing of archaeological digs in Guatemala that welcome visitors and directions on how to get to them. Address: Archaeological Institute of America, Box 1901, Kenmore Station, Boston, MA 02215.

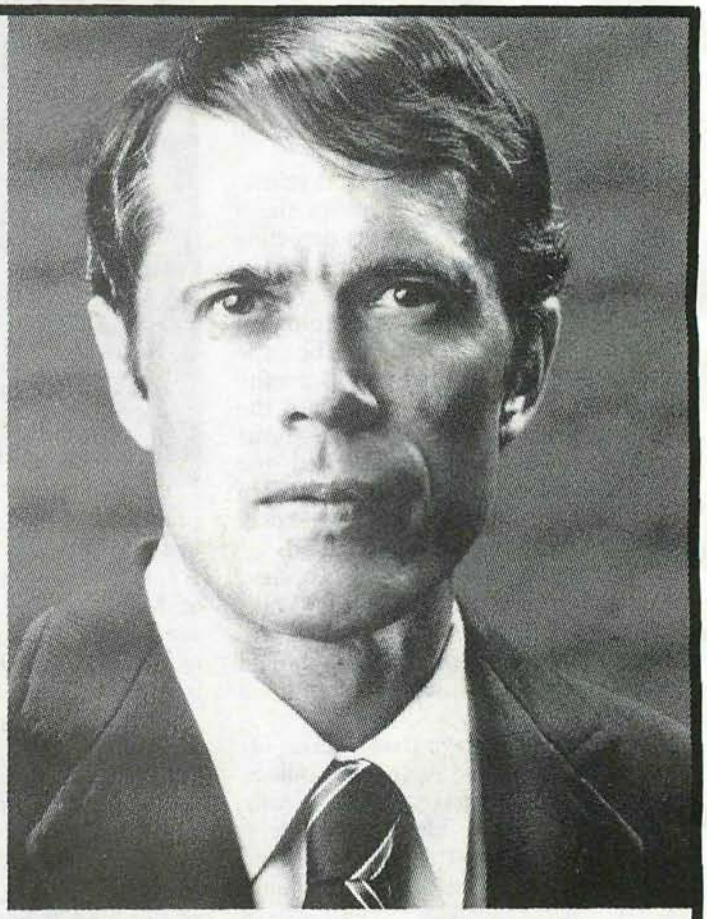
Reinhard Wins Award

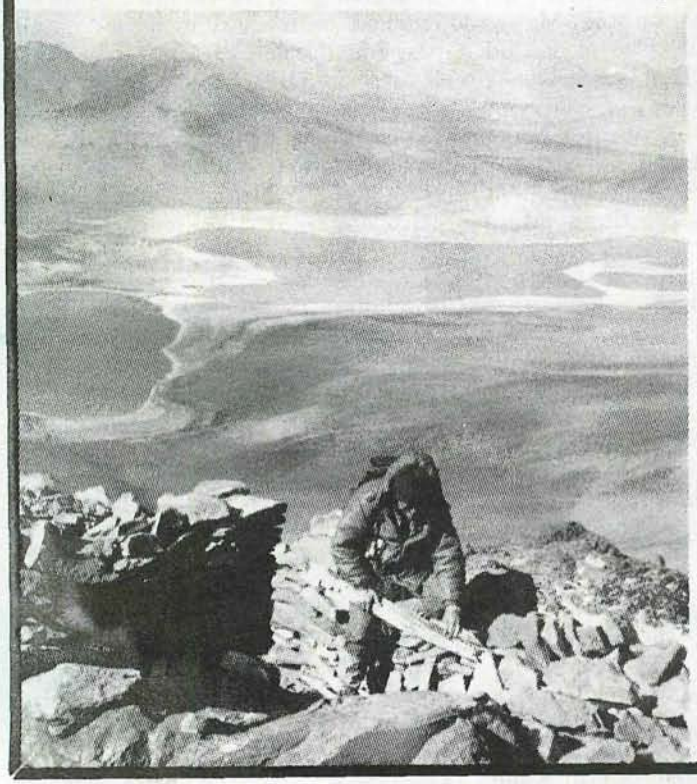
FELLOW CLUB member and anthropologist Johan Reinhard, 43, is a top Rolex Award winner for 1987. The prize was given to enable Reinhard to continue his studies of ancient religious sites high atop Andean mountains.

Sacred sites occur from Colombia to Chile and range in altitude from 5,200 to 6,700 meters. This makes them the world's highest ruins, and their study has become a subdivision of anthropology known as "high-altitude archaeology."

The full significance of these enigmatic sites is yet unknown, but mountain worship played a major part in early religions and still exists in some parts of South America today. Reinhard's work promises to reveal much about the pre-Columbian view of life and many of South America's traditions.

Reinhard has studied the Nazca Lines, Chavin and Tiahuanaco cultures. Using "sacred geography" to examine mountain/fertility cults, he says, "Allows a more unified explanation of the sites' function and location." Reinhard is author of *The Nazca Lines,* available through the publishers of *Boletín de Lima*, which is an analysis of the lines from the perspective of mountain worship.





In the last five years, Reinhard has made over 100 ascents of sacred mountains. He has discovered 40 of the almost 100 sites so far known. Frozen Inca bodies thought to be human sacrifices and metal statues have been found inside rock structures. According to Reinhard, mountain deities were thought to control weather, and, as a consequence, crops and fertility.

Reinhard is also a pioneer in high altitude diving, a discipline useful for Andean studies as mountain lakes were thought to be doors to the gods' mountain dwellings.

While study at these altitudes is very difficult, the heights discourage treasure hunters. The ruins are also among the few religious sites to escape destruction by the Spanish. Reinhard is anxious to complete his work because of his concern that sites will be disturbed in the future as interest in recreational mountain climbing increases.

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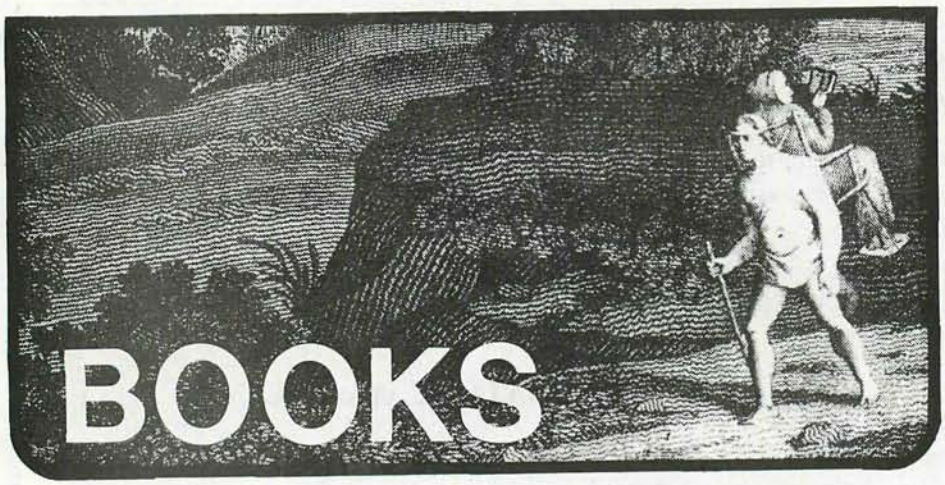

EXPEDITIONS TO NOWHERE

Expeditions to Nowhere by Paddy Sherman. Seattle: The Mountaineers, 1981, 226 pp., maps, photos, $14.95.

Paddy Sherman's sprint up Vancouver's Grouse Mountain -- daily before breakfast, six to eight times on weekends -- shames those of us who occasionally jog around the neighborhood in clement weather. For Sherman, a 49-year-old writer, publisher and mountain climber, it is a scrimmage with himself, to make sure the heart still pumps, the muscles hoist, the lungs bellow.

In *Expeditions to Nowhere,* Sherman roves to Peru (twice), Kenya (twice), Tanzania, Alaska, Canada, Argentina and Bolivia to scale the heights of Huascaran, Alpamayo, Kenya, Kilimanjaro, Meru, McKinley, Aconcagua and Illimani.

Sherman's companions are a volunteer brigade of fortyish and older men not content to watch the grey river course silently by. Whoever answers -- a phone call, a Sunday morning telegram -- is counted in. Most are natives of other countries now living in Canada. Fips Borda, a bearded Austrian interior designer, served with German mountain troops and spent most of World War II in a Russian POW camp. Ralph Hutchinson is from Kenya. Scipio 'Skip' Merler is a German businessman raised in Italy. Roger Neave, a 67-year-old past president of the Alpine Club of Canada, was climbing before Sherman was born.

Sherman is Canadian and a heretic: "One should never dash frivolously off to corners of the world where great mountains grow simply because they are there." He does so, of course, at every opportunity.

And a jester: "The ice (on Mt. Manitoba) was too wretched even to waste on a gin and tonic." "We plunged slowly on (up Huascaran), hoping, with idiotic optimism that brings you halfway around the world...in the first place, that conditions would get better as suddenly as they had become worse."

He rails against the evils of Alpine-style climbing, a race to the summit and an even faster descent. It is dangerous because it can precipitate pulmonary and cerebral edema and acute mountain sickness. Worse yet, sprinting destroys the camaraderie of the climb and the *fete populaire* of drinking cognac while lounging around the camp stove. Sherman is a devotee of the Eric Shipton school of mountain climbing, "which held that those expeditions are best that can be organized on the back of an old envelope."

For instance, one of Sherman's cronies telephoned in early 1976 to suggest that they head back to Kenya to finish off Mt. Kenya, a peak they had failed to conquer three years before. The $2,000 air fare for such a jaunt was a bit steep -- about $10 per yard of unscaled peak -- so they quickly patched together a detour via Argentina to scale Aconcagua.

Although Aconcagua is not technically difficult, it is a dangerous mountain, and the Argentine Army maintains a small cemetery there.

The army requires a "medical examination" at the Puente del Inca guardhouse, 9,000 feet (2,743 meters), where a 20-year-old soldier ran a hungover Sherman ragged round an improvised track before pronouncing him fit.

The following year, returning from a climb up Bolivia's 21,201-foot (6,462-meter) Illimani, Sherman and crew hitched a ride in a truck jammed with Bolivian peasants and miners. Bolivia's 200th coup had just occurred, leading Sherman to muse, "If such people knew John Updike, they would agree with him that conquerors and governments pass before the people as dim rumors, as entertainments in a hospital ward. Those people on the truck would be as polite as ever, of course, to those who come to climb their peaks. And as puzzled. For how do you explain expeditions to nowhere to those with nowhere else to go?"

-- Dan Buck

DREAMING

Dreams of Amazonia by Roger D. Stone, 1986 paperback, ills., pp.193, Penguin Travel Library.

If you're thinking of leaving your career and civilization for the wilds of the Amazon Basin, you may first want to read Dreams of Amazonia by Roger D. Stone. My family and I went to the Peruvian *selva* (jungle) in 1984. I wish I had been introduced to Stone first.

Stone, a member of the World Wildlife Fund-U.S., has over 20 years experience in the Brazilian Amazon. He starts out with the early explorations of Francisco de Orellana and the naturalist Henry Walter Bates and flows onward to the proposed "Jungle Empires" of Henry Ford and Daniel Ludwig. Along the way, we read about the history of Brazil and its attitude toward the "green monster." Then, too, we learn unlimited trivia for future evenings, e.g. the reason for the decline of the rubber industry in Brazil (subtropic leaf blight in the wilds) and why the industry succeeded in Malaya (organized plantations).

We learn of the "infallibility" of Henry Ford and his eventual failure at producing rubber in Fordania/Belterra near Santarem. This stands out as Ford's only failure during his illustrious career as an industrialist. The problem with rubber in the Amazon Basin was leaf blight. Trees could only grow randomly. In a plantation leaf blight spreads like wildfire. In Malaya where the blight did not exist, the plantation system was a great success and harvesting very efficient.

Stone's conclusion is that the future and survival of the Amazon does not lie with agronomy and cattle ranching or general farming which demand great amounts of land.

-- David Smith

Mountain Music of Peru, Queros: The Shape of Survival and Peruvian Weaving, films by John Cohen for rental or purchase, Hazardous Films, RD 1, Tompkins Corners, Putnam Valley, New York 10579.

Art of the Incas, by Henri Stierlin, Rizzoli International Publications, Inc., New York, 1984, $50.

Tropical Biology: An Ecological Approach edited by Bruce Williamson, Organization of Tropical Studies, Box DM, Duke Station, Durham, NC 27706, 1983, $25.

Fishers of Men or Founders of Empire? by David Stoll, Zed Press, and Cultural Survival, 11 Divinity Avenue, Cambridge, MA 02138, 1982. About the Wycliffe Bible Translators in Latin America.

Great Little Railways, BBC Publications, 9.95 Pounds Sterling. Describes some of the more thrilling narrow gauge Andean lines.

High Altitude and Man by John B. West and Sukhamay and Lahiri. Clinical Physiology Series, American Physiological Society, Bethesda, Maryland, pp.199.

Fairly technical piece on effects of high altitude on climbers.

In the Rainforest: Report from a Strange, Beautiful, Imperilled World by Catherine Caufield. Knopf 1985, pp.304, $16.95.

An American journalist's report on endangered land, animals and tribal peoples. Includes excellent section on the potential value of rainforest products for mankind.

Hoaxes by David Roberts. Sierra Club Books, $12.95.

Fun reading about various explorers with shaky claims -- ranging from the suspicious to outright fraud.

Lost Cities & Ancient Mysteries of South America by David Hatcher Childress, Adventures Unlimited Press, Box 22, Stelle, IL 60919, 400pp., maps, photos, $9.95 plus $1.25 postage/handling. Essays on all the wild theories and fringe topics that continue to inflame imaginations -- Inca lost cities and tunnels, giants, Atlantis, living dinosaurs, etc.

The Voyage of the Water Witch: A Scientific Expedition to Paraguay and the La Plata Region (1853-1856), by Robert D. Wood, S.M., St. Mary's University, San Antonio, Texas, 114pp., paperback, 1985, $10.00.

The Martyred City: Death and Rebirth in the Andes by Anthony Oliver-Smith, University of New Mexico Press, Albuquerque, New Mexico, 87131, 296pp., illus., 1986, $14.95 paper, $29.95 cloth. The story of the massive earthquake that buried the Peruvian town of Yungay in 1970 -- the destruction and reconstruction.

Que Pasó? An English-Spanish Guide for Medical Personnel, by Drs. Martin P. Kantrowitz and William Lord Coleman, and Antonio Mondragon, fourth edition, revised and expanded, University of New Mexico Press, Albuquerque, NM 87131, $5.95.

A House of My Own: Social Organization in the Squatter Settlements of Lima, Peru, by Susan Lobo, U. of Arizona, Tuscon, 190pp., $7.95.

Teach Them Good Customs: The Transplanting of a Culture, by Robert D. Wood, S.M., St. Mary's University, San Antonio, Texas, 150pp., 1985, $15.

Galápagos: A Natural History Guide by M. H. Jackson, The University of Calgary Press, 1985, pp.283, maps, illus., photos. Splendid paperback guide covering history, flora and fauna of the islands. It contains extensive bibliographies and checklists. For sale at Denver office of South American Explorers Club.

The two below books are new publications available through Lonely Planet, 1555D Park Ave., Emeryville, CA 94608; (415) 428-2211; Postage $1 first book; 50 cents each additional book:

Chile & Easter Island: A Travel Survival Kit by Alan Samagalski, $8.95. Peru: A Travel Survival Kit by Rob Rachowiecki, $12.95. Absolutely greatest guide yet to the best of Peru.

Ecuador & The Galápagos Islands: A Travel Survival Kit by Rob Rachowiecki, $7.95. Not to be confused with the author's other splendid guide, *Climbing and Hiking in Ecuador,* this equally fine book offers info not only on travel in the mountains, but jungle and the Galápagos. At this price, a real bargain.

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LETTERS

HIGH MARKS

I enjoyed reading the Lee report on Vilcabamba (see Book Reviews, Issue #13, *South American Explorer,* "Sixpac Manco: Travels Among the Incas" by Vincent Lee) and found that the frivolity of the title -- and a few other remarks in the expedition narrative -- were entirely offset by the value of the achievement and the professional way the expedition went about the task.

Particularly impressive was the matching of skills to the job at hand, as in applying knowledge of ballistics to finding Huayna Pucara. The report gives a fascinating insight into the type of clue that needs to be identified in this sort of historical exploration. Lee made a great story out of a detail that no one else had bothered to give time to -- that is, uncovering the Neo-Inca defensive sites by following records of the Spanish advance.

The importance of his work resides in the way it effectively mops up behind Savoy. Now no one will ever again be able to doubt that Savoy had, indeed, identified once and for all the site of the post-Conquest Inca capital.

-- John Beauclerk
England

SAY IT WITH FLOWERS

I would like to get in touch with members interested in the flowering genus *Heliconia*.

-- Dexter Ball
Manatee Sound Farm Box 1753
Bradenton, FL 33506

SPRAY MISTY FOR ME

I have been doing ethnobotanical field work on the Upper Napo River in the Department of Loreto. While collecting plants with the Secoyas, an Indian group living on the Santa Maria River, a tributary of the Napo, I witnessed part of a biannual malaria control program carried out on the entire Napo River of Peru. Spraying teams visit every house in the zone and spray all surfaces of the buildings, including floors and walls. The intention is to break the malarial cycle perpetuated by mosquitoes.

The DDT is manufactured by the Montrose Chemical Corporation of Terrance, California, and the boxes are marked 'Water Dispersible DDT Powder -- To WHO/SIF Specifications.' They are also marked, *'POISON.'*

The Upper Napo is inhabited by mostly Quechua natives and a small group of Secoyas with whom I have worked in the past.

The current use and application method of DDT is irresponsible and dangerous for the following reasons:

The Secoyas and Quechuas generally eat while seated on the floor, and small children play on the floor. The spraying teams did not instruct the people to wash the floors or take other precautions. In fact, they seem to believe there is very little health risk involved with constant exposure to DDT, explaining that the DDT 'was not very strong this time.'

This casual attitude is passed on to the Quechuas and Secoyas who have even less access to information about DDT's toxicity.

Any household goods not removed during spraying are contaminated and subsequently handled without washing. Chickens and pets often die after such sprayings -- clearly an economic loss to their owners. Long after the spraying teams depart, the DDT remains to cause harm. DDT boxes left in the village are used to store rice -- yet another example of the disturbingly relaxed attitude toward a chemical illegal to use in the United States and other countries.

Malaria does appear to pose a health problem in this area. A recent study by a medical team working with a group of Secoyas on the Putumayo River recommended a three years of biannual DDT spraying in the Putumayo region. (See BOLETIN DE LIMA, No. 21, May 1982.)

I do not question the need for malaria control, but I am convinced that the careless spraying of DDT without proper warnings and precautions should be stopped!

Moreover, I would like to know what other countries have malaria control programs (Africa?) using DDT. Also, I would appreciate hearing the views of health professionals from Peru or elsewhere on this question.

-- Steven King
Box 588
Skokie, Illinois 60077

HIGHWAY ROBBERY

We need information, anecdotes, newspaper clips, photos, etc., on early 1900s South American exploits of Butch Cassidy, the Sundance Kid, Etta Place, Kid Curry, Richard Perkins, and other members of U.S. outlaw gang, the Wild Bunch, reportedly active in Argentina, Bolivia, Chile, Peru, Brazil, Venezuela, and Mexico. Thanks much.

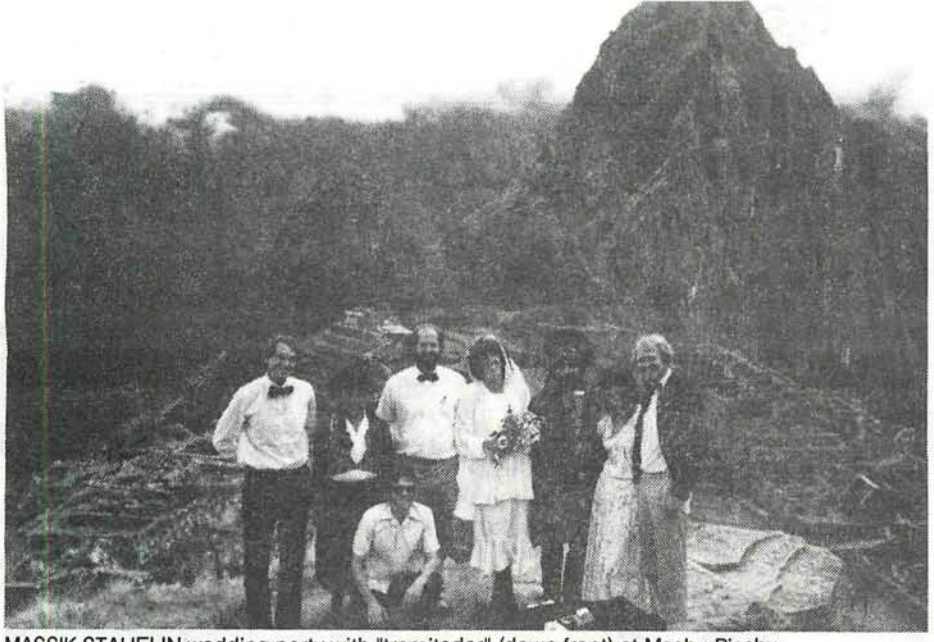
-- Dan Buck
-- Anne Meadows
100 Tenth St. SE
Washington, DC 20003

BIRD, THOU NEVER WERT

I'm getting a good laugh out of the short note on the condor [Issue No.13, *South American Explorer*] that carried off a four-week-old baby in its claws which condors don't have. The mother's situation sounds like that of anyone who has lost something which may raise suspicions: make up an excuse! Blame it on a condor -- the bird can't prove her wrong. The question that comes to my mind, however, is: What actually happened to the kid?

Blaming condors is nothing new to people in the Andes. In northern Peru, we found local people commonly believe condors are involved in witchcraft. And on one occassion, we came across a condor being stoned to death for being a witch. The military/PetroPeru folks had some notion that the condors we fitted with radio transmitters were sent from Ecuador "with electronic equipment" for espionage.

Reconsidering what I said about claws on condors, I take it back. They do have claws, but they are more like those of a turkey than of a chicken. A condor can do more damage kicking



MASSIK-STAHELIN wedding party with "tramitador" (down front) at Machu Picchu.

you than grabbing you. This I know from personal experience. As Ms. Hurlbutt says, strong eagles have a tough time trying to lift something like a good size rabbit. However, they don't wait for animals to decompose; their sharp beaks can rip thorugh the toughest hide regardless of how long the animal has been dead. Condors do wait sometimes for other vultures to 'case' a carcass and make sure there are no wild dogs or other threats nearby. They are cautious.

In the case of Sra. Taype Cardenas and her baby, I'm sure the woman herself would have been enough to keep all the condors in Peru off her baby. So, what really happened to the kid?

-- Peter Schoonmaker
Harvard University

SEEING RED II

In the 13th issue of the South American Explorer, in a letter entitled "Red Tape," I read of a *tramitador* ("manipulator of red tape") engaged by Hilary Bradt to help retrieve a bag from the airport. Her account brought to mind our own recent experience with the *tramitador.*

In quest of the unique and extraordinary, and in flight from the terrors of tradition, we thought to marry among the ruins of Machu Picchu. Neither mate being Catholic, we opted for a civil marriage.

Two dear friends living in Cuzco were entrusted to prepare the way. They soon encountered an unconquerable storm of red tape, and so enlisted the services of a *tramitador.* The documents blossomed: birth certificates, proof of bachelorhood, passports, residence cards, medical certificates, signatures from local and national officials. And the expenses: xeroxing, translating, doctors fees, stamps, seals, and several preliminary trips from Cuzco to Machu Picchu.

Upon arrival in Cuzco, we were assured that all was in order. So we headed off to Machu Picchu. The morning of the big day it rained, well no, rather the weather unleashed an unremitting deluge. The *tramitador* can cut red tape, but only God determines the weather.

Anyway, the rained stopped, and we set out for the spot, up by the Guardian's Hut. What did we care that tourists exclaimed, "Oh, look, George, they're getting married!" and "*Mira, un matrimonio*!" We were married, and thought it extraordinary.

Epilogue: Later "our" *tramitador* handed over the official wedding documents. And, by the way, although he knew everything about us long before he had the pleasure of our honored acquainatance and friendship, there had been a small oversight in the matter of religion. Not actually having asked us, but being required to supply the facts, he safely assumed that we were Catholic. Oh, well...

-- Jody Massik
-- Andreas Stahelin
Scottsdale, AZ

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NOTES & TIPS & NOTES & TIPS & NOTES & TIPS & NOTES & TIPS & NOTES & TIPS

FOR YOUR PERUSAL

IT'S HERE IN ONE seven-page, single-spaced, small print little package of knowledge and wisdom -- the South American Explorers Club Peru Packet.

It covers airfare Miami-Lima-Miami, answers all your questions about terrorism, personal safety, getting robbed, and who's running the country. It tells you how to recognize and overcome traveling hassles, tips on what to bring, what you need to know about the currency, climate and seasons, high altitude, areas to visit, and most important, how to get to the Clubhouse in Lima for a cup of tea.

Cost to members is US$3; non-members US$5.

IN THE WILD

MEMBER GLORIA Hall of the American Coop School in La Paz wanted us to pass on to the rest of you how to contact the Bolivian Wildlife Society (La Asociacion Boliviana Pro-Defensa de la Naturaleza or PRODENA BOLIVIA).

Founded in 1980, the Bolivian Wildlife Society publishes a newsletter and is working on a number of conservation projects, such as fundraising for the development of their newly acquired Estancia San Rafael de Amboro into a biological, educational and paramedical center with facilities for visiting scientists and captive breeding programs.

Registered in England and the United States as a non-profit organization, membership fees are tax-deductible. Write: Reginald Hardy, Bolivian Wildlife Society (PB), Tan-yr-allt, Llantilio Crossenny, Gwent NP7 8TH, United Kingdom.

BATTING AVERAGE

THE NEARLY 1,000 kinds of bats in the world comprise almost one quarter of the world's mammal species. Bats range in size from that of a bumble bee to bats with a six-foot wing span.

In the tropics, bats often account for more than half of all mammal species, and the biomass of bats equals in some places that of all other mammals combined. Nonetheless, most bat species have never been studied and are often not even mentioned in ecosystem studies. In tropical rainforests, bats are far more important than birds in dispersing seeds and

are the primary pollinators of hundreds of plants and trees. Yet bats are endangered in many areas and further study is necessary to confirm their importance to forest regeneration.

To learn more about these fascinating mammals, write Bat Conservation International, c/o Brackenridge Field Laboratory, University of Texas, Austin, TX 78712.

HEART WARMING

JOURNEYS International tour company is collecting old winter coats to distribute to Andean *campesinos* in remote areas. If you happen to be signing up with Journeys this year, the coat you donate is worth $25 and the amount can be applied to the cost of a trip with Journeys. For more info: Journeys, 1120 Clair Cr., Ann Arbor, MI 48103; Tel: (313)665-4407.

COLD RECEPTION

FOR SOME YEARS now the Chilean government has operated the Polar Star, a guest house in Antarctica open to visitors from November to March. An Airforce Hercules C-130 cargo plane makes the trip from Punta Arenas to a base on King George Island, carrying 40 passangers. Accomodations are described as adequate; rooms are shared and bathrooms communal. A bar is available, and cruises can be arranged. A six-day tour, including three nights at the guest house, costs US$2,500.

For information, contact Ladatco Tours, 2220 Coral Way, Miami, FL 33145; Tel: 854-8422. Other companies offering tours to Antarctica are:

Travcoa: February and March, 23 days to Patagonia and Antarctica with stops in Argentina and Chile; $5,195 from Buenos Aires. A 30-day tour that includes a 7-day glacier cruise in Chile is $6,695. Write or call Travcoa: 875 North Michigan Ave., South America Dept., Suite 3732, Chicago, IL 60611; Tel: (800) 992-2005.

Sobek Expeditions: December-January, trip departs from Miami with stopovers in Santiago and Punta Arenas, Chile and King George Islands, as well as six-day guided camping trip of Antarctica; $5,800. Information: P. O. Box 1089, Angels Camp, CA 95222; Tel: (200) 736-2661.

Society Expeditions: December and January cruises to Antarctica and the Chilean fjords, as well as Antarctica circumnavigation. Info: 723 Broadway E., Seattle, WA 98102.

Lindblad Cruises: December; A 15-day and an 18-day cruise aboard the *Explorer* from Chile to Antarctica; from $4,750-$5,450. Info: Box 912, Westport, CT 06881; Tel: (800) 243-5657.

TREE TO GET READY

TROPICAL deforestation is "the sleeper issue of the 20th century," declares the many biologists, climatologists and agronomists making up the International Society for the Preservation of the Tropical Rainforest.

The Society is concerned with making known the catastrophic consequences of widespread forest destruction. They estimate that of the 10 million or more species that inhabit the earth, two-thirds will be found in tropical forests, and that over one million of those species will die out before the end of the century. They predict the disappearance of nearly all tropical forest in the next 25 years,

causing a billion people to starve.

The Society urges governments to change their land use policies and promote plans, such as the use of fast growing Gmelina and certain bamboos species that grow three feet in 24 hours (0.00004 miles per hour), Tilapia fish farming, logging controls and multispecies agriculture.

For more information write: International Society for the Preservation of the Tropical Rainforest, 3302 N. Burton Ave., Rosemead, CA; Tel: (818)572-7273.

Another organization working on behalf of jungle is the Rainforest Action Network, now pressuring the World Bank to stop funding rainforest destruction. They are also petitioning the Burger King fast food chain to stop promoting forest destruction for beef production in Central America.

INCAN monolith of Saywhite.

YOUR HEALTH

WILL YOUR health insurance company pay for health care in South America? Some coverage stops the minute you cross the border, while some companies, like Blue Cross, cover hospital and nursing care. Check your policy. If there is no exclusion, you are covered wherever you go.

You may want to investigate traveler's health insurance. Here are a couple of companies: *Health Care Abroad*, 923 Investment Bldg., 1511 K St. NW, Washington, DC 20005. They offer 60-day coverage in any country. For long-term coverage, contact: *World Access,* 2115 Ward Connecticut, NW, Suite 200, Washington, DC 20037.

ON PORPOISE

IF YOU'RE looking for an unusual Amazon trip sometime in the future, you might want to check in with P.A.R.D. (Preservation of the Amazonian River Dolphin).

P.A.R.D.'s interest is primarily the rare Pink River Dolphin (*Inia geoffrensis*). It is also involved in protection projects for all Amazon dolphins, now endangered by heavy commercial fishing. Fishermen kill the dolphin for its left eye and sexual organs which are made into amulets. Homesteaders kill dolphins for food where rivers have been overfished. P.A.R.D. hopes to insure strictly enforced fishing regulations and laws protecting all dolphins.

P.A.R.D. hosts excursions that include taking dolphin counts, recording their 'speech' and swimming with these remarkable creatures.

P.A.R.D. is a non-profit organization. For more info about their organization: P.A.R.D., Roxanne Kremer, 3302 N. Burton Ave., Rosemead, CA 91770; Tel: (818)572-PARD.

NEW WORLD NEWS

THE ROCKY Mountain Institute for Pre-Columbian Studies publishes a very newsy Newsletter three times a year. Subscriptions cost US$5. Those interested can write: Teddy Dwalt, Editor, 2258 South Holland Way, Lakewood, CO, 80227.

ROCK OF AGES

MANY READERS have written in for directions on getting to the Incan monolith of Saywhite.

The Saywhite stone has more than 203 figures carved in relief -- fields, terraces, rivers, lakes, reservoirs, pumas, monkeys, deities. It is located on the west side of Saywhite Valley, 4.5 km on the Abancay-Cuzco road.

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HIGHER AUTHORITY

IF WE WERE to do justice to the climbing scene in South America, we would need a magazine twice as big. For ten years, a big bang expansion has been in progress in the continent's climbing, stretching as far as Mawson Peak in the Antarctic to Sugar Loaf in Rio. Climbers from South America and elsewhere have been pushing the limits of difficulty and hardship.

The Cordilleras Blanca and Huayhuash in Peru and the Fitzroy-Cerro Torre areas of Argentina remain the hotspots, and rightly so. Compared to the expense and hassle of the Himalayas, Peru is an alpine playground.

Access is simple, it's cheap, and the complex fluted peaks provide spectacular climbing. All this at an altitude high enough to give a real sense of accomplishment, but still under the Death Zone. Patagonia, with its desperate weather, is a Yosemite locked in an ice age. Nowhere in the world is the weather such a foe, and nowhere are the challenges of rock and ice so extreme.

Of late, a new multinational generation of young, hard climbers has entered the fray. These are ambitious *andinistas*, in superb condition. Their climbing is increasingly daring and determined. Leaving the valley without tents or sleeping bags, forsaking fixed ropes and camps, they climb with a minimum of food and fuel, using speed as safety. This is called alpine-style. The margin for error is paper thin.

The new routes are too numerous to report, but there have been several unusual events which merit attention.

Aconcagua, being nothing more than a 23,000-foot pile of fossilized scree, is still the highest point in the hemisphere, making it an easy target for climber interest and sarcasm. The north side is gentle to the point of despair, consisting of mile after eternal mile of talus, loose and exhausting at altitude. The south side, however, presents a steep 10,000-foot cliff, the biggest face in the Andes. In general, the sarcasm comes from those who have not visited the mountain, for in climbing it, one learns respect.

Italians in 1976 rode motorbikes to within 1,500 feet of the summit. After this desecration came Chris Reveley, a Colorado man whose legs are thicker than most people's chests. Chris ran in Nikes from the bottom to 21,500 feet in one go, but stopped there. He also made the first ascent of the south wall alpine-style in 1982. Two years later the first woman climbed this face: Titoune Bouchard, along with her husband John. In 1984, Richard Garrett of Alaska became the youngest person to climb Aconcagua. He was 14.

In other news, a strong team of six French climbers set out to traverse the entire Cordillera Huayhuash in Peru from Rondoy to Yerupaja, more than 12 miles of extreme difficulty at high altitude. This was in 1984, and they were defeated, leaving the challenge open. The same season, the first all-Peruvian ascent of Yerupaja, highest peak in the Huayhuash, was completed.

In 1983, in the Cordillera Blanca, a new route was climbed on Cayesh -- the East Face. This is Peru's hardest summit, and this was only the second ascent, the first being back in 1960. Also in 1983, an Englishman, Norman Croucher, climbed difficult Tocllaraju. He climbed on two artificial legs, having lost the real ones in a train accident. Perhaps the most entertaining note about Andean climbing was the ascent of Huascaran Norte by two dogs. The canines hail from the village of Musho below the peak, and tagged along with a pair of Spanish climbers, reaching the summit (21,825ft) on August 29, 1984. Now that they have perfected their skills, we breathlessly await the first all-dog ascent of Peru's highest peak. [Source: *American Alpine Journal* 1977,'84,'85]

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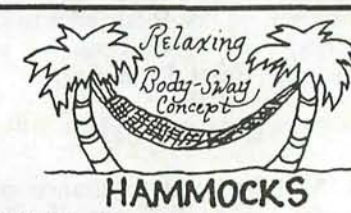

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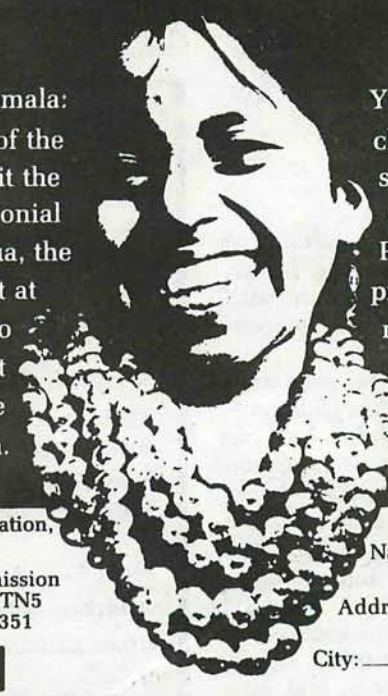

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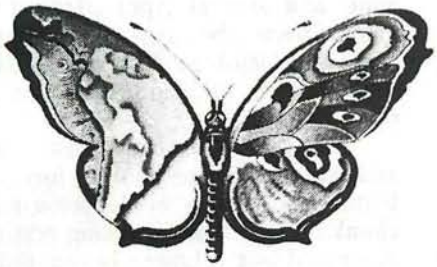


CLUB NEWS

MEMBERS ONE AND ALL take note of the new information included on the inside cover of this edition of the magazine which lists the services members can look forward to when they visit the Lima Clubhouse.

Avail yourself of these benefits. It is your reward for the foresight displayed in becoming a member.

IF YOU HAVEN'T WHIZZED through the Club, engaged in some enviable expeditionary activities, you will not know about events such as the fact the Club Andino is now housed in other quarters. Their new address can be obtained by asking the Lima Managers.

The space previously occupied by these stalwarts now houses the Club library which has recently been fitted with new shelves constructed by John Kunkel. There are still a few gaps in these bookcases which will, no doubt, be filled by generous donations of out-of-print books or even in-print books.

John, incidentally, is constructing some sort of climbing exercise wall back behind the kitchen. Presumably this will be appreciated by those taking on the more rigorous task of facing Alpamayo. What it will do for the esthetics of the Club is another question.

BETSY AND JOHN deserve the highest commendation for what they have accomplished as Club Managers. You know this already if you have been at the Club recently. More members are being signed up than ever before, the library has been catalogued, the bathtub no longer leaks, and members rave about the excellence of service.

Now, old timers will remember that such was not always the case, that there might even have been cause for slight dissatisfaction or displeasure. Once we even received a letter of complaint. I forget the gripe. Nothing important really, I'm sure. Still. Well, no more. You will find the Clubhouse a warm and friendly place to plan expeditions, advised and cared for by knowledgable and cheerful staff.

WE'VE JUST INVESTED in a Tandy 1000 SX computer with hard disk and Database III Plus, with the fond hopes of finally getting the membership list in order. Of course, we did this some years back with another computer and a software program called Datastar which so fouled things up that we're still weeding out duplicates, triplicates and countless errors. Still, one hopes....

Here is what the system is designed to do: It should allow for almost instantaneous updating of memberships, addresses, etc. We'll be able to do trickly little things like call up all the Quechua-speaking kayakers in Peoria. Best of all, it should allow us to keep track of countless irate members and help us get a magazine to them when a magazine comes out. If it does no more than this, it will be a resounding success and do much to increase brotherly affection between us and the ever increasing membership.

TRIP REPORTS are rapidly becoming the Club's single greatest resource. Trip reports are now the most up-to-date source of specialized information on just about any topic of interest to club members. We have trip reports on scaling Aconcagua, boat trips through the Pongo de Mainique, butterfly collecting, how not to get robbed, carnaval in Salvador and Rio, temporary hut building in the jungle, expeditions into Vilcabamba, miscellaneous ways of getting to the Galápagos, Torres del Paine, the Darien Gap, teaching English and taking Spanish lessons. You name it and if we don't have a trip report on it, we will have when you get back.

Trip reports are available for everyone at the Lima and Denver offices. To order them by mail, write a letter, being specific as possible about interests, budget, time available. We will cull out appropriate reports. Naturally, there is a small charge for xeroxing and postage but no where near the awful price to be paid for not knowing what's what in Oxapampa.

SPEAKING OF EXPEDITIONS, we get a lot of letters asking, well...here's a composite sample:

Dear Sirs: (sometimes *"Gentlemen:"* if they haven't heard from us before):

I've always wanted to go on an expedition and a have wonderful and exotic experience. I've written the National Geographic but so far they haven't deigned to respond to my questions about insect repellent and the availablity of gorp in Satipo.

I'm a male nurse with a Class A drivers license. I have travelled extensively in Minnesota and I have Masters Degree in botany. I would give anything for the opportunity to help out (volunteer if necessary) as a member of some group. Can you help?

-- John Philoplant

Now this letter obviously deserves a straightforward, honest response. Either the Club can help or it can't. John Philoplant does not want to be told we are going to put him on some computer and if the wheel of fortune number shows up, he'll be cheek by jowl with Jacque Costeau studying plants in Manu. Actually maybe he does want that but be that as it may, we can't promise anything of the sort.

What we can do is this:

If you are serious about an expedition, it will have to be arranged at the Club in Lima. There are reasons for this: if we are to do well, we've got to meet members, get to know them, and find out what they need.

There is one exception. For groups already established or formed, we provide most of this service by mail.

The best way to get on an expedition, is to start your own. How to do this? Come to the Clubhouse with an idea and let the Managers in Lima help you put it together. John and Betsy will go over your plans, make suggestions, provide logistical info, help you with research and, if you can give them up to week, will chat up other people, let them know about the idea, sound them out, and present you with some suitable candidates to consider for inclusion in your expedition.

Now, for anyone wishing to do this, there are two basic requirements.

1.) You should allow at least one month for the expedition.

2.) You must be in good health.

This is a realistic way to launch an expedition. Its effective and cheap. Of course, we do expect you to write up a report upon your return so that we can have this information in our files.

NEWS SHORTS

GOOD MONEY AFTER BAD

IN THE PAST, foreign aid was frequently funneled into Third World development activities that caused vast and irreparable environmental damage. The Marginal Highway that cuts through the Peruvian jungle is only one example of countless such schemes backed by United States A.I.D. funds. The Polonoroeste road building and land development project in Brazil was another, funded by US$434.4 million from the World Bank.

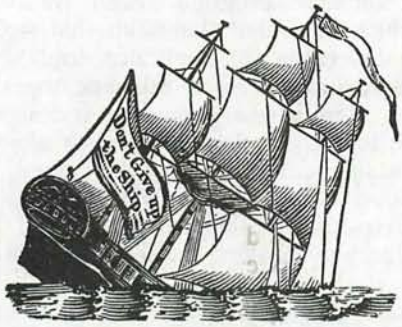
These represent ecological devastation on a grand scale. Polonoroeste helped wipe out an area of rainforest the size of Great Britain. Now there is hope that this may be history. A new law currently requires U.S. representatives to the World Bank and to three other multilateral development banks to actively promote sweeping environmental reforms in the banks' lending policies. U.S. executive directors of these banks are instructed to promote the hiring of professional staff trained to identify ecological impacts of projects up for funding. Henceforth these directors are urged to involve conservation groups and native peoples' organizations in the planning of ecologically delicate projects. Finally, the law is aimed at promoting more environmentally beneficial projects. Examples of these are agroforestry, solar energy systems and integrated pest control.

BOTTOMS UP

DIVING TEAMS on both sides of the continent are making news investigating sunken ships. A Spanish merchant ship lying in nearly 50 meters of water for some 300 years has been found by a Mexican diving team off Ecuador. The team has brought up clay pots used to carry wine, olive oil and seeds.

In 1792, a Spanish galleon, *Nuestra Señora de Loreto*, sank at the mouth of the River Plate. Historians for 20 years have searched for the ship which was only located early last year. The *Nuestra Señora*, captained by Diegho de Guiral, carried brandy -- some 20,000 liters or so. The booze alone, still drinkable after 300 years old, is worth nearly $100 million. It is understandable, therefore, why Argentine and Uruguayan divers are interested in raising the cargo.

Once the brandy is removed,



along with several cannon, efforts will be made to bring the ship to the surface. The vessel has already been declared a national monument by the Uruguayan government.

WINGING HOME

PARACAS, ON THE southern coast of Peru, is the only place in the world where one can see condors, flamingos and penguins in the same area.

But sometimes, such as last year, one sees hardly any birds at all. Normally cold ocean currents provide large quantities of fish and plankton for large concentrations of sea birds. But in 1983, the warm waters of El Niño displaced fish populations and forced birds to find other feeding grounds. Then, too, fishermen, using part of the Paracas Reserve as industrial scallop breeding ground, contributed to a drop in bird populations until they were ousted early last year.

Now the birds are returning, says Enrique Ortiz, a bird specialist and conservationist working at the Paracas Reserve. "A year ago there were hardly any birds. Now there are at least 40 species."

Most of the birds come from North America during the cold months between November and March.

Others, including petrels, penguins and several types of albatross, arrive from the Antarctic between April and October. Condors are often seen feeding on dead sea lions and other carrion.

Note: Conservationists and archaeologists are joining forces to battle a bill which would cut a major chunk off the Paracas wildlife preserve. Approved by the Lower House, the bill would allow the city of Ica to develop a resort and industrial park.

DIVERSE IT GETS

BRITISH AND Brazilian scientists have taken up residence on Maraca Island in the Uraicorea River, an Amazon tributary in Brazil's Roraima territory.

Fifty scientists will spend a year collecting flora and fauna, studying soils and conducting other experiments in the dense rainforest that covers this 37 X 15 mile island. The undertaking is to be known as the Maraca Rainforest Project.

Several years ago, the island was declared a nature reserve. A research station was built to house scientists.

John Hemming, Director of the Royal Geographical Society, is head of the project. Says Hemming, "Untold plant and animal species inhabit the jungle, and Brazil has almost 60% of the world's rainforest. There is a moral need to protect the vast genetic diversity and learn its secrets."

A FRIEND INDEED

PRESIDENT LEON Febres-Cordero has accepted the Honorary Chairmanship for the Campaign for the Galápagos Islands. The campaign is working to preserve the environment of the islands and hopes to raise US$1.5 million.

Funds are urgently needed to preserve the eggs and food supplies of native species by removing the wild goats, pigs and dogs brought to the islands by settlers in the late 1800s.

COLD BLOODED

THE FIRST reported dinosaur fossil find in the Antarctic was announced by scientists working for the Argentine Antarctica Institute. The 70 million-year-old fossil fragment belonged to an armoured herbivore of the order Ornithischia.

This discovery is evidence that

dinosaurs were distributed world wide. The fossil was found on James Ross Island near the tip of a peninsula that juts out toward South America.

ON THE MOVE

THE BELOVED Leonards of Cuzco -- Luisa and "Lennie" -- have put their ranch and lodge up for sale and moved to Calca. From there, Lennie plans to assemble a history of the legendary lost city of Paititi and offer logistical support and guidance to explorers.

A SNITCH IN TIME (or Crying Fowl)

THE SHRIKE-TANAGER and the Ant-Shrike are sentinel birds of the Amazonian rainforest. Especially skilled at detecting fast flying objects, these birds perch attentively while other species rummage through the under-growth for insects. Should a predator bird appear, the sentinel sounds the alarm.

Now Charles A. Munn of Wildlife Conservation International has produced evidence that sentinel birds may abuse their calling. Often a sentinel bird will sound the alarm falsely in order to pounce on the insect flushed from hiding by another bird. And deception works! The sentinel, in such cases, usually gets the bug.

Do the foraging birds see through the ruse? Yes, says Munn, but even when they recognize the sentinel is crying wolf, they still hesitate. This gives the sentinel the competitive edge in capturing an insect. Still, says Munn, it seems a small price to pay for sentinel protection.

SLAT HAPPY

AFTER WAITING many days for good weather and thwarted by heavy ice on the the Shield and West Rib, Jimmy Katz and John Harlin climbed La Garganta ('throat') route up Mt. Huascaran (6,792 meters), Peru's highest peak, and made a ski descent.

This route has been skied several times before with alpine touring gear, but this was a first with Nordic skis. The pair found the snow conditions demanding, except for the lower slopes.

WEATHER THOU GOEST

AN ICE CORE from a 5,790-meter Peruvian peak is giving scientists from the United States a new look at climatic conditions in tropical latitudes long ago.

Scientists, using drilling techniques perfected during polar research and analyzing thin layers of dust between each year's snow deposit, have been able to reconstruct rainfall patterns, temperature and volcanic activity for a region where virtually no records exist. Evidence of dry periods between 570-610 A.D and 1250-1320 A.D. and 1720-1860 A.D. is clearly discernible from core samples, as is an unusually wet period between 1500 and 1720 A.D. Researchers able to correlate volcanic deposits in the ice with known dates of major volcanic eruptions.

The Andean ice samples provide new evidence of the 'Little Ice Age' that took place between the 1500s and the late 19th century, an age that lowered temperatures and sent glaciers southward in the northern hemisphere.

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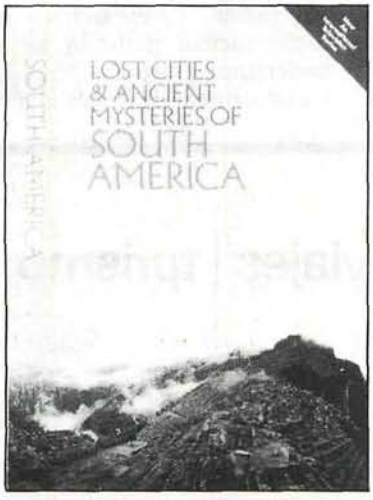

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ADVENTURES UNLIMITED PRESS

News Shorts Continued...

ZAMORA RUINS FOUND

A LOST CITY founded by Spanish conquistadors shortly after the conquest has come to light, discovered by mineral explorers prospecting in the Amazon jungle.

The city, identified as Zamora de Valladolid, is located near Ecuador's border with Peru in the Zamora-Chinchipe area. Reports of the discovery describe colonial roads and massive walls overgrown with jungle.

Zamora de Valladolid, according to historical records, was founded more than 400 years ago by Juan Salinas de Loyola, a captain-general under Francisco Pizarro.

The discovery of Zamora de Valladolid bodes well for attempts to find other lost cities dating back to the latter part of the 16th century.

ROCK AND RUIN

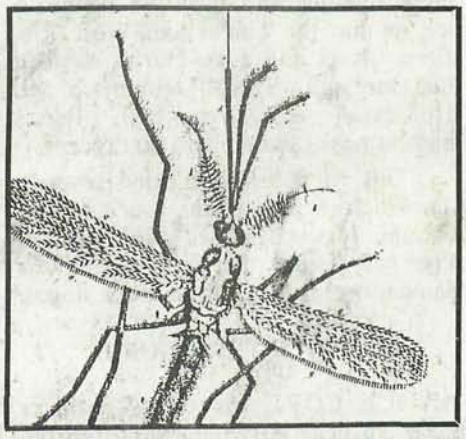
A 31-YEAR-OLD archaeology student recently discovered a large settlement just a few miles away from South America's most renowned ruin site, Machu Picchu.

Reynaldo Chohfi, a Brazilian student studying at U.C.L.A., claims to have made the discovery while examining 30-year-old aerial photographs.

Chohfi recently returned from an expedition with Octavio Fernandez, a friend and archaeologist with Peru's Instituto Nacional de Cultura which confirmed the discovery. Hacking their way through dense jungle, the two reached the site Chohfi had pinpointed on the photos to find a massive wall two meters thick, two meters high and more than 300 meters long. Chohfi believes his discovery is part of what was once a major settlement, a view echoed by John Hemming, Director of London's Royal Geographical Society.

FEVERISH ACTIVITY

DOCTORS AT Walter Reed Army Hospital are in the process of testing a new malaria vaccine on people.



Volunteers infected with malaria have been given a vaccine with some of the same charactistics as the malaria sporozoite.

"It was the most benign immunization I have ever received," said reseacher J. D. Chulay two days after being innoculated. "The vaccine we are testing is probably the purest vaccine given to animals or humans."

The new vaccine will be tested on 20 to 40 volunteers deliberately infected by malaria carrying mosquitoes.

FROM ON HIGH

RESEARCHERS have stepped back in time, tracing prehistoric man's 4,000-year-old footsteps with aerial black and white and infrared photography.

Anthropologists Payton Sheet and Tom Sever have photographed 62 possible archaeological sites around the Arenal Volcano in northwestern Costa Rica. They had to overcome such natural obstacles as heavy rainfall, dense forest and ten volcanic eruptions smothering the region in ash. Their most impressive accomplishment to date has been the detection of ancient half-meter-wide, buried footpaths which they traced for kilometers, linking villages, campsites and cemeteries.

The prehistoric paths have eroded into trenches over the centuries and then filled with fertile sediment better suited to plant growth than the surrounding soil. This enabled lush grasses to grow along the paths. Infrared photography can detect the difference in vegetation, and aerial black and white photography detects the faint shadow of the path's depression. Researchers are tracing these ancient paths in an attempt to understand more about pre-Columbian social structures, rituals and resources.

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